

A REVIEW OF THE CHINESE NURSERY-WEB SPIDERS (ARANEAE, PISAURIDAE)

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ABSTRACT. The present paper deals with nine genera and 32 species of the family Pisauridae from China, including two new genera, *Dianpisaura* (type species, *Pisaura lizhii* Zhang 2000) and *Qianlingula* (type species, *Qianlingula bilamellata* new species), and 11 new species, *Dolomedes costatus*, *D. raptorooides*, *Eurychoera banna*, *Hygropoda argentiata*, *H. campanulata*, *H. menglun*, *H. yunnan*, *Qianlingula bilamellata*, *Q. jiafu*, *Q. turbinata* and *Thalassius paralbocinctus*. The genus *Eurychoera* Thorell 1897 and the species *Perenethis sindica* (Simon 1897) are newly recorded from China. The males of the species *Dianpisaura lizhii* (Zhang 2000) and *Dolomedes mizhoanus* Kishida 1936 are described for the first time. The study indicates that *Thalassius bottrelli* Barrion & Litsinger 1995 and *T. balingkinitanus* Barrion & Litsinger 1995 from the Philippines should be transferred to the genus *Hygropoda*. The species *Dolomedes insurgens* Chamberlin 1924 and *D. pallitarsis* Dönitz & Strand 1906 are shown to be the junior synonyms of *D. saganus* Bösenberg & Strand 1906, and the species *D. strandi* Bonnet 1929 is considered to be a junior synonym of *D. senilis* Simon 1880. Scanning electron microscopy is used to study the spigot morphology of several pisaurids. The SEM results indicate the differences of pisaurid spigots at the generic level, both in shape and numbers. A cladistic analysis of 21 species from China is presented.

Keywords: Araneae, Pisauridae, Asia, taxonomy, new species

The family Pisauridae, commonly called nursery-web spiders, currently contains 51 genera and more than 330 species (Platnick 2002). Members of the family are distributed worldwide and vary in habitus, size and life style. For example, members of the genera *Dolomedes* Latreille 1804 and *Thalassius* Simon 1885 are large species (body length up to 30 mm) hunting on the surface of freshwater ponds or streams, whereas species of the genera *Eurychoera* Thorell 1897 and *Polyboea* Thorell 1895 are much smaller (body length 10 mm or so) and hunt on permanent webs.

Ever since the family Pisauridae was erected by Simon in 1890, many species and genera have been reported. But most of these descriptions lack valuable illustrations of diagnostic characters, such as the female epigynum and the male palpal organ. For example, the result of a recent systematic study indicated that among the 34 specific names applied to nearctic spiders of the genus *Dolomedes*, only seven of them were valid (Carico 1973). Fortunately, some genera from North America and Africa have been revised recently by Carico (1972, 1973, 1976, 1981),

Blandin (1975, 1976, 1977) and Sierwald (1987). But most Asian pisaurid species are so poorly known that revisionary work is highly desirable.

As Sierwald (1997) pointed out, the main systematic problem of this family concerns the delineation of the Pisauridae and the definition of subfamilies. Unfortunately, no synapomorphies have been recognized for at least the majority of pisaurid genera that could distinguish them as a single clade. Recent progress in systematic studies has identified 10 genera of this family as a monophyletic clade and placed them in the re-erected South American family Trechaleidae Simon 1890 (Sierwald 1990; Carico 1993).

To date, 10 genera and 33 species have been described from China (Song et al. 1999; Platnick 2002; Zhang & Zhang 2003), including two new genera and 11 new species from this study. The monotypic genus *Archipirata* Simon 1898, from Turkmenistan and China, is not included in this study because of the lack of material.

METHODS

All measurements given are in mm. Palp measurements are shown as: total length (fe-

mur, patella, tibia, tarsus). Leg measurements are shown as: total length (femur, patella and tibia, metatarsus, tarsus). Terms used in this study are as follows: Eye: ALE = anterior lateral eye; AME = anterior median eye; MOA = median ocular area; PLE = posterior lateral eye; PME = posterior median eye. Spinneret and spigot: AC = aciniform gland spigot; ALS = anterior lateral spinneret; CY = cylindrical gland spigot; MAP = major ampullate gland spigot; mAP = minor ampullate gland spigot; N = nubbin; PI = piriform gland spigot; PLS = posterior lateral spinneret; PMS = posterior median spinneret. Female copulatory organ: ab = accessory bulb; al = anterior lobe; bor = basal oblique rumple of lateral lobe; bs = base of spermatheca; ca = carina; cd = copulatory duct; fd = fertilization duct; fo = fossa, small epigynal pit; hs = head of spermatheca; lad = large anterior depression; ll = lateral lobe; mf = median field; mlr = mesal longitudinal ridge of median field; ss = stalk of spermatheca. Male copulatory organ: bac = basal apophysis of cymbium; bpe = basal projection of embolus; bpt = basal protuberance of tegulum; bsa = bulbous section of apical division in *Dianpisaura* and *Pisaura*; c = conductor; da = distal apophysis; dtp = distal tegular projection; e = embolus; ful = fulcrum; gl = guiding lamellae of conductor; ma = median apophysis; mae = membrane accompanied with embolus; sa = saddle in *Dolomedes*; st = subtegulum; t = tegulum; ta = tibial apophysis.

The material used in this study belongs to the following institutions: Museum of Hebei University, Baoding, China (MHU, M. S. Zhu); Institute of Zoology, Academia Sinica, Beijing, China (IZB, L. J. Jia); Guangxi University, Nanning, China (GU, Y. Q. Zhang); Department of Biology, Inner Mongolia Normal University, Huhhot, China (BIMN, G. M. Tang); Faculty of Life Sciences, Hubei University, Wuhan, China (LSHU, F. X. Liu); Department of Biology, Tunghai University, Taichong, Taiwan (BTU, I. M. Tso).

RESULTS

Spinneret morphology.—The female spinneret morphology of 17 species from China was studied using scanning electron microscopy. The photos of 16 species belonging to nine pisaurid genera and one lycosid genus are presented here for further comparison.

ALS with two MAP and many PI (e.g., Figs. 177–179, 183, 184, 207, 208, 215, 216, 221, 222, 251, 252, 257, 258, 263, 264). The nubbin rooted in one reduced MAP in *Eurychoera* (Fig. 202), and the reduced basal part of PI in *Dianpisaura* (Fig. 178) are both unique among the known pisaurid genera. The number of piriform gland spigots varies in different genera.

PMS small and almost triangular, with one or two mAP and some small AC (e.g., Figs. 180, 185, 186, 203, 204, 210, 217, 218, 223, 224, 253, 254, 259, 260, 265, 266). Nubbin present in all examined genera except for *Perenethis* (Fig. 218). CY present only in *Hygropoda* (Figs. 209, 211).

PLS with reduced numbers of AC (e.g., Figs. 181, 187, 205, 219, 225, 255, 261, 267). In *Hygropoda*, six large CY are observed at the outer margin of its distal end (Figs. 212, 213).

PHYLOGENETIC ANALYSIS

Taxa.—The terminal taxa are exemplars embodying the actual character states exhibited by a given species. Twenty-one pisaurid species belonging to nine genera known from China are selected as in-group members: *Dianpisaura lizhii* (Zhang 2000), *Dolomedes mizhoanus* Kishida 1936, *D. nigrimaculatus* Song & Chen 1991, *D. raptor* Bösenberg & Strand 1906, *D. saganus* Bösenberg & Strand 1906, *D. senilis* Simon 1880, *D. stellatus* Kishida 1936, *D. sulfureus* L. Koch 1877, *Eurychoera banna* new species, *Hygropoda higenaga* (Kishida 1936), *Perenethis fascigera* (Bösenberg & Strand 1906), *P. sindica* (Simon 1897), *Pisaura ancora* Paik 1969, *P. bicornis* Zhang & Song 1992, *P. lama* Bösenberg & Strand 1906, *P. mirabilis* (Clerck 1757), *P. sublama* Zhang 2000, *Polyboea zoniformis* (Wang 1993), *Qianlingula bilamellata* new species, *Thalassius paralbocinctus* new species and *T. phipsoni* F.O. Pickard-Cambridge 1898. The other 11 Chinese pisaurid species are excluded in the in-group as we currently lack male specimens.

Judging from the cladogram presented by Griswold (1993), Pisauridae is the sister group of the clade Trechaleidae + Lycosidae. The genera *Trechalea* Thorell 1869 (Trechaleidae) and *Hippasa* Simon 1885 (Lycosidae) serve as outgroups in the cladistic analysis with the exemplars *Trechalea longitarsis* (C.L. Koch

1847) and *Hippasa lycosina* Pocock 1900 respectively.

Characters and character states.—Character scoring is presented in Table 1. The character matrix contains 51 characters: 10 characters derived from the somatic morphology, five from female spinneret spigots, 10 from female copulatory organs, 24 from male copulatory organs, and two from behavior. Characters were scored through direct observation on the specimens in all cases except those of *Trechalea longitarsis* (C.L. Koch 1847) and behavior. The characters of *T. longitarsis* were scored based on the descriptions and illustrations of Sierwald (1990) and Carico (1993). For the behavioral characters assumptions were sometimes made for the exemplars based on published reports regarding their higher taxa.

Character descriptions.—*Somatic characters* (Fig. 1): Character 0: Anterior eye row; 0 = almost straight or slightly recurved, 1 = strongly recurved with ALE and PME in line (e.g., Fig. 170), 2 = procurved (e.g., Figs. 97, 141). Anterior eye row almost straight or slightly recurved is the most common and widely distributed character state in the Pisauridae and its sister group, and thus assumed to be the primitive condition.

Character 1: Size ratio of AME to ALE; 0 = AME larger than ALE, 1 = AME equal to ALE, 2 = AME smaller than ALE. As Sierwald (1997) indicated, AME larger than ALE is the primitive condition.

Character 2: Size ratio of AME to PME; 0 = AME smaller than PME, 1 = AME equal to PME, 2 = AME larger than PME. AME smaller than PME is most common in the Pisauridae and outgroups.

Character 3: MOA; 0 = wider than long, 1 = as long as wide, 2 = longer than wide.

Character 4: Clypeus height; 0 = larger than AME diameter, 1 = smaller than AME diameter. The clypeus height larger than AME diameter is widely distributed in the Pisauridae and outgroups.

Character 5: Number of promarginal teeth on chelicera; 0 = three teeth, 1 = two teeth and several denticles (Fig. 18), 2 = four teeth. Chelicera with three promarginal teeth appears to prevail in the Pisauridae.

Character 6: Number of retromarginal teeth on chelicera; 0 = three teeth, 1 = four teeth, 2 = two teeth. Chelicera with three retromar-

ginal teeth is the most common and widely distributed character state in the Pisauridae and assumed to be the primitive condition by Sierwald (1997) and Griswold (1993).

Character 7: Sternum; 0 = longer than wide, 1 = as long as wide, 2 = wider than long.

Character 8: A pair of distal spines on ventral side of tibia; 0 = present, 1 = absent. Most species of the Pisauridae have a pair of distal spines on the ventral side of tibiae.

Character 9: Tarsus of legs; 0 = normal, 1 = flexible. Flexible tarsi of legs (state 1) are exhibited in *Hygropoda* and *Trechalea*.

Female spinneret spigots: Character 10: Number of piriform gland spigot in ALS; 0 = more than 70, 1 = less than 60.

Character 11: Base of piriform gland spigot in ALS; 0 = normal (e.g., Figs. 190, 208, 216, 222, 252, 264, 270), 1 = reduced (Fig. 178). Differing from other species of the Pisauridae, the bases of piriform gland spigots in ALS are reduced in *Dianpisaura lizhii* (Zhang 2000) and *D. songi* (Zhang 2000).

Character 12: Number of minor ampullate gland spigot in PMS; 0 = two (e.g., Figs. 180, 186, 210, 218, 224, 260, 266, 272), 1 = one (Figs. 204, 236, 254). Judging from the available data, posterior median spinneret with two minor ampullate gland spigots is most common in the Pisauridae.

Character 13: Cylindrical gland spigot in PMS; 0 = absent (e.g., Figs. 180, 185, 203, 217, 223, 253, 259, 265, 271), 1 = present (Figs. 209, 211).

Character 14: Cylindrical gland spigot in PLS; 0 = absent (e.g., Figs. 181, 187, 205, 219, 225, 255, 261, 267, 273), 1 = present (Figs. 212, 213). Judging from available data, the cylindrical gland spigots in PMS and PLS are absent in almost all species of Pisauridae except *Hygropoda higenaga* (Kishida 1936).

Female copulatory organ: Character 15: Anterior depression of epigynum; 0 = absent (e.g., Figs. 19, 66, 80, 151, 165), 1 = small and fossa-shaped (e.g., Figs. 99, 136, 144), 2 = large (Fig. 3). The anterior depression of epigynum is absent in most species of the Pisauridae and related groups, e.g., *Hippasa*, *Uliodon* and *Trechalea* (see Yin et al. 1997: 19, fig. 6d; Griswold 1993: 19, fig. 18; Carico 1993: 226, figs. 13, 37, 43, 47, 51, 55, 59, 63, 67, 71, 73), and thus this character state is assumed to be the primitive condition.

Table 1.—Character scoring. Non-applicable character states indicated by “—”. Unknown character states indicated by “?”.

	<i>T.</i>		
	<i>longitarsis</i>	<i>H. lycosina</i>	<i>D. lizhii</i>
Somatic characters			
0) AER straight or slightly recurved; strongly recurved; procurved	0	0	0
1) AME > ALE; AME = ALE; AME < ALE	0	0	2
2) AME < PME; AME = PME; AME > PME	0	0	0
3) Width of MOA/length: >1; =1; <1	0	0	2
4) Clypeus height/AME: >1; <1	0	0	0
5) Promarginal teeth #: 3; 2; 4	0	0	0
6) Retromarginal teeth #: 3; 4; 2	1	0	0
7) Sternum length/width: >1; =1; <1	0	0	0
8) Distal ventral spines on tibia: present; absent	?	0	0
9) Leg tarsus: normal; flexible	1	0	0
Female spinneret spigots			
10) PI in ALS #: >70; <60	?	0	0
11) PI base in ALS: normal; reduced	?	0	1
12) mAP in PMS #: 2; 1	?	0	0
13) CY in PMS: absent; present	?	0	0
14) CY in PLS: absent; present	?	0	0
Female copulatory organ			
15) Anterior depression: absent; small; large	0	0	2
16) Intromittent orifice: anterior; median or posterior	0	0	0
17) Margins of <i>ll</i> : parallel; arched; diverging; forming curves	0	0	2
18) Posterior margin of <i>mf</i> to genital groove: near; far from	0	0	0
19) <i>cd</i> : normal; wide and flat	0	0	1
20) <i>cd</i> : sclerotized; slightly sclerotized; membranous and saccate	0	0	0
21) <i>cd</i> loops: 0 or 0.5; 2; 3	0	0	1
22) Spermatheca chambers: 3; 2; 1	0	0	0
23) Spermatheca: inflated; not inflated	0	0	0
24) <i>ab</i> : absent; present	0	0	0
Male palp			
25) Patella/tibia: <1; >1	?	0	0
26) Palpal tibia/half of cymbium: >1; <1	0	0	0
27) <i>ta</i> : distinct; reduced	0	1	0
28) <i>ta</i> situation: distal; median	0	—	0
29) <i>ta</i> shape: finger-like; branched; rectangular; lamellar	3	—	0
30) Tip of <i>ta</i> to base of conductor: not reached; reached or surpassed	0	—	0
31) <i>bac</i> : absent; present	0	0	0
32) <i>bac</i> shape: humped; hooked	—	—	—
33) <i>st</i> situation: under; behind	1	1	0
34) <i>bpt</i> : absent; present	0	0	0
35) <i>dtp</i> : present; absent	1	1	0
36) <i>bsa</i> : absent; present	0	0	1
37) <i>ma</i> : present; reduced	0	0	0
38) <i>ma</i> : separate; continuous; membranous	0	0	0
39) <i>da</i> : present; reduced	0	0	0
40) <i>da</i> : separate; continuous; membranous	0	0	0
41) <i>sa</i> : absent; present	0	0	0
42) <i>ful</i> : absent; present	0	0	0
43) <i>c</i> : distinct; small or reduced	1	1	0
44) <i>c</i> : translucent or opaque; strongly sclerotized; membranous	?	0	1
45) <i>gl</i> : absent; present	0	0	0
46) <i>e</i> : long; medium; short	1	1	0
47) <i>bpe</i> : absent; present	0	0	0
48) <i>e</i> curve: counterclockwise; clockwise	0	0	0
Behavior			
49) Web construction: yes; no	1	0	0
50) Egg sac on spinnerets: no; yes	1	1	?

Table 1.—Extended.

	<i>P.</i>		
	<i>H. higenaga fascigera</i>	<i>P. sindica</i>	
Somatic characters			
0) AER straight or slightly recurved; strongly recurved; procurved	0	2	2
1) AME>ALE; AME=ALE; AME<ALE	0	1	1
2) AME<PME; AME=PME; AME>PME	0	0	0
3) Width of MOA/length: >1; =1; <1	0	0	0
4) Clypeus height/AME: >1; <1	0	0	0
5) Promarginal teeth #: 3; 2; 4	0	0	0
6) Retromarginal teeth #: 3; 4; 2	0	2	2
7) Sternum length/width: >1; =1; <1	0	0	0
8) Distal ventral spines on tibia: present; absent	0	0	0
9) Leg tarsus: normal; flexible	1	0	0
Female spinneret spigots			
10) PI in ALS #: >70; <60	0	1	?
11) PI base in ALS: normal; reduced	0	0	?
12) mAP in PMS #: 2; 1	0	0	?
13) CY in PMS: absent; present	1	0	?
14) CY in PLS: absent; present	1	0	?
Female copulatory organ			
15) Anterior depression: absent; small; large	0	1	1
16) Intromittent orifice: anterior; median or posterior	0	0	0
17) Margins of <i>ll</i> : parallel; arched; diverging; forming curves	2	2	2
18) Posterior margin of <i>mf</i> to genital groove: near; far from	0	1	1
19) <i>cd</i> : normal; wide and flat	0	1	1
20) <i>cd</i> : sclerotized; slightly sclerotized; membranous and saccate	0	2	2
21) <i>cd</i> loops: 0 or 0.5; 2; 3	0	1	1
22) Spermatheca chambers: 3; 2; 1	1	0	0
23) Spermatheca: inflated; not inflated	0	0	0
24) <i>ab</i> : absent; present	0	0	0
Male palp			
25) Patella/tibia: <1; >1	1	0	0
26) Palpal tibia/half of cymbium: >1; <1	0	1	1
27) <i>ta</i> : distinct; reduced	0	0	0
28) <i>ta</i> situation: distal; median	0	0	0
29) <i>ta</i> shape: finger-like; branched; rectangular; lamellar	0	0	0
30) Tip of <i>ta</i> to base of conductor: not reached; reached or surpassed	0	1	1
31) <i>bac</i> : absent; present	0	0	0
32) <i>bac</i> shape: humped; hooked	—	—	—
33) <i>st</i> situation: under; behind	0	0	0
34) <i>bpt</i> : absent; present	0	1	1
35) <i>dtp</i> : present; absent	1	0	0
36) <i>bsa</i> : absent; present	0	0	0
37) <i>ma</i> : present; reduced	0	0	0
38) <i>ma</i> : separate; continuous; membranous	0	0	0
39) <i>da</i> : present; reduced	0	0	0
40) <i>da</i> : separate; continuous; membranous	2	0	0
41) <i>sa</i> : absent; present	0	0	0
42) <i>ful</i> : absent; present	0	0	0
43) <i>c</i> : distinct; small or reduced	0	0	0
44) <i>c</i> : translucent or opaque; strongly sclerotized; membranous	2	0	0
45) <i>gl</i> : absent; present	0	0	0
46) <i>e</i> : long; medium; short	2	0	0
47) <i>bpe</i> : absent; present	1	0	0
48) <i>e</i> curve: counterclockwise; clockwise	1	0	0
Behavior			
49) Web construction: yes; no	?	1	1
50) Egg sac on spinnerets: no; yes	0	0	0

Table 1.—Extended.

<i>P. ancora</i>	<i>P. bicornis</i>	<i>P. lama</i>	<i>P. mirabilis</i>	<i>P. sublama</i>	<i>P. zona-</i> <i>formis</i>	<i>Q. bilamellata</i>	<i>T. paral-</i> <i>bocinctus</i>	<i>T. phipsoni</i>
0	0	0	0	0	2	1	1	1
2	2	2	2	2	2	0	0	0
0	0	0	0	0	0	1	2	2
0	0	0	0	0	0	2	0	0
0	0	0	0	0	0	0	0	0
0	2	0	0	0	0	0	0	0
0	1	0	0	0	2	0	0	0
2	0	2	1	2	1	1	2	0
0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	0	?	0
0	0	0	0	0	0	0	?	0
0	0	1	0	0	1	0	?	0
0	0	0	0	0	0	0	?	0
0	0	0	0	0	0	0	?	0
1	1	1	1	1	1	0	0	0
0	0	0	0	0	0	0	0	0
3	3	3	3	3	2	0	2	2
0	0	0	1	0	1	0	1	1
0	0	0	0	0	1	0	0	0
0	0	0	0	0	2	0	1	1
2	2	2	2	1	1	0	0	0
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	1
1	1	?	1	1	0	1	0	0
1	1	1	1	1	1	1	0	0
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	—	—
0	1	0	0	0	1	3	—	—
1	0	1	0	1	1	0	—	—
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	1	1	1	1	0	0	0	0
0	0	0	0	0	0	0	0	0
2	0	2	0	2	0	1	0	0
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	1	—	—
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	1	1
0	0	0	0	0	0	0	0	0
1	1	1	1	1	0	0	0	0
0	0	0	0	0	1	1	0	0
0	0	0	0	0	0	0	2	2
0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	1	1	1
1	1	1	1	1	0	?	1	1
0	0	0	0	0	0	?	0	0

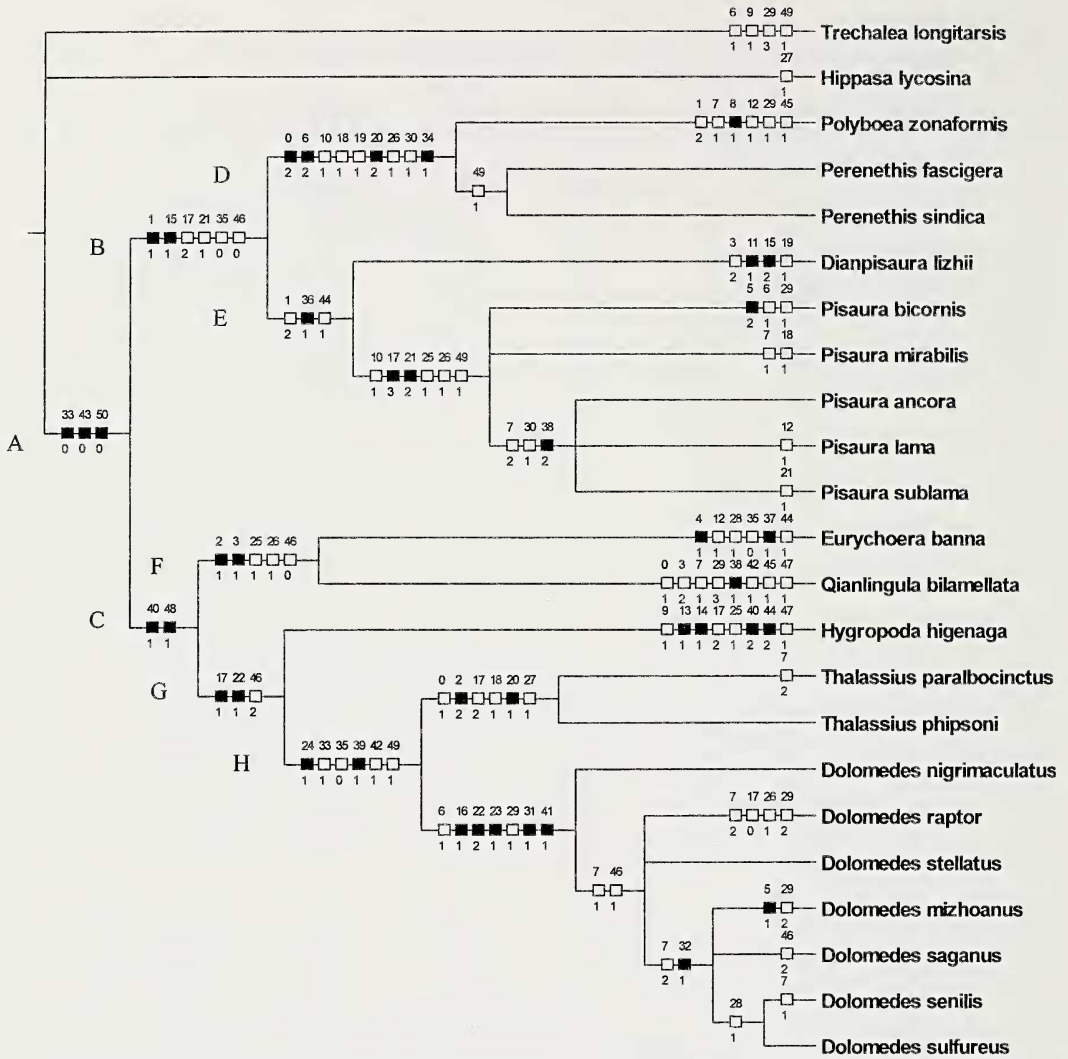


Figure 1.—Preferred Cladogram. DELTRAN character optimization; character mapping: black rectangles = non-homoplastic character state origination, white rectangles = homoplastic character state.

Character 16: Position of intromittent orifice; 0 = at anterior half part of epigynum (e.g., Figs. 67, 115, 152, 166), 1 = at median or posterior half part of epigynum (e.g., Figs. 32, 41, 52). The intromittent orifice located at anterior half part of epigynum is widely distributed in the Pisauridae. Although the intromittent orifices locate near the median part of epigynum in *Hygropoda higenaga*, it is coded as “0” for all other species of *Hygropoda* known from China have intromittent orifice located at anterior half part.

Character 17: Lateral margins of lateral lobes; 0 = parallel (e.g., Figs. 66, 151), 1 = arched (e.g., Figs. 19, 46), 2 = diverging an-

teriorly (e.g., Figs. 3, 80, 107, 144, 165), 3 = forming curves as in *Pisaura* (e.g., Figs. 113, 120, 130).

Character 18: Posterior margin of median field; 0 = near the genital groove (e.g., Figs. 3, 19, 66, 113, 151), 1 = far from genital groove (e.g., Figs. 99, 130, 165).

Character 19: Copulatory duct; 0 = normal (e.g., Figs. 32, 67, 81, 137, 152, 166), 1 = wide and flat (e.g., Figs. 4, 100, 145).

Character 20: Copulatory duct; 0 = sclerotized (e.g., Figs. 4, 32, 67, 81, 115, 152), 1 = slightly sclerotized (Figs. 166, 172), 2 = membranous and saccate (Figs. 100, 108, 145). The slightly sclerotized copulatory duct

(state 1), membranous and saccate copulatory duct (state 2) are not as common in the Pisauridae as the sclerotized copulatory duct.

Character 21: Number of loops of copulatory duct; 0 = no or half loop (e.g., Figs. 32, 67, 81, 152, 166), 1 = two loops (e.g., Figs. 4, 100, 145), 2 = three or more loops (e.g., Figs. 115, 126, 131). As Sierwald (1997) indicates, the copulatory duct with fewer loops is the primitive condition.

Character 22: Number of spermathecal chambers; 0 = three chambers with base, stalk and head (e.g., Figs. 4, 67, 100, 137, 145, 152), 1 = two chambers with base and head (e.g., Figs. 81, 166), 2 = one chamber (e.g., Fig. 32). Spermatheca with three chambers is most common in the Pisauridae and assumed to be primitive condition. In *Dolomedes*, the spermatheca is slender and long, and is not divided into different chambers.

Character 23: Shape of spermatheca; 0 = inflated and easily distinguished from copulatory duct (e.g., Figs. 4, 67, 81, 100, 137, 145, 152, 166), 1 = not inflated and not easily distinguished from copulatory duct (e.g., Figs. 25, 32) as in *Dolomedes*.

Character 24: Accessory bulb; 0 = absent, 1 = present (e.g., Figs. 32, 166). Accessory bulb of spermatheca is present in *Dolomedes* and *Thalassius*.

Male palp: Character 25: Length of patella and tibia; 0 = patella shorter than tibia, 1 = patella longer than tibia.

Character 26: Palpal tibia; 0 = longer than half of cymbium, 1 = shorter than half of cymbium.

Character 27: Tibial apophysis; 0 = distinct (e.g., Figs. 5, 42, 68, 84, 101, 138, 146, 153), 1 = reduced (Figs. 167, 173). Most species of the Pisauridae have a distinct tibial apophysis on male palp, while in *Thalassius* the tibial apophysis is small or reduced (Sierwald 1987: 51, figs. 1, 2, 54, 55, 58–61, 126, 127). As Griswold (1993) indicated, the palpal tibia with a distinct apophysis is the primitive condition.

Character 28: Position of tibial apophysis; 0 = at distal end of tibia (e.g., Figs. 5, 42, 84, 101, 138, 146, 153), 1 = near median region of tibia (Figs. 48, 60, 68). The distal tibial apophysis is most common in the Pisauridae.

Character 29: Shape of tibial apophysis; 0 = finger-like (e.g., Figs. 5, 68, 84, 101, 138), 1 = with two small branches (e.g., Figs. 42,

146, 147), 2 = almost rectangular in lateral view (Figs. 22, 34), 3 = with two lamellae (Figs. 153–155).

Character 30: Tip of tibial apophysis; 0 = not reaching the base of conductor (e.g., Figs. 5, 42, 84, 123, 153), 1 = reaching or surpassing the base of conductor (e.g., Figs. 102, 110, 117, 139, 147).

Character 31: Basal apophysis of cymbium; 0 = absent, 1 = present (e.g., Fig. 42). A basal cymbial apophysis is present in *Dolomedes*.

Character 32: Shape of basal apophysis of cymbium; 0 = humped (Figs. 26, 33, 53); 1 = hooked (Figs. 21, 42, 48, 60). The well developed and hooked basal apophysis of the cymbium is assumed to be the derived condition.

Character 33: Position of subtegulum; 0 = under the tegulum, not visible or only partly visible in ventral view (e.g., Figs. 5, 83, 101, 138, 146, 153), 1 = behind the tegulum, mostly visible in ventral view (e.g., Figs. 42, 167, 173).

Character 34: Basal protuberance of tegulum; 0 = absent, 1 = present (Figs. 101, 102, 109, 110, 146). Tegulum with basal protuberance is known to be present in some genera of the *Perenethis* genus-group, such as *Perenethis* and *Polyboea* (Sierwald 1997).

Character 35: Distal tegular projection; 0 = present (e.g., Figs. 5, 42, 68, 101, 138, 146, 173), 1 = absent (Figs. 83, 153). Judging from the study of Sierwald (1990), the distal tegular projection is present in many genera of Pisauridae and Griswold (1993) indicated that male palp with a distal tegular apophysis was one of the synapomorphies of the clade (Pisauridae + (Trechaleidae + Lycosidae)). Thus it is assumed to be the primitive condition here.

Character 36: Bulbous section of apical division; 0 = absent, 1 = present (e.g., Figs. 5, 138). Bulbous section of apical division on male palpal organ is present in *Pisaura* and *Dianpisaura*.

Character 37: Median apophysis; 0 = present (e.g., Figs. 5, 42, 83, 101, 138, 146, 153, 173), 1 = reduced (Fig. 68). Sierwald (1990) indicated that the absence of a median apophysis in some pisaurid genera was considered a reduction, and therefore derived.

Character 38: Form of median apophysis; 0 = separate and sclerotized with only basal membrane connected with tegulum (e.g., Figs.

5, 42, 83, 101, 122, 147, 173), 1 = being a continuous projection of tegulum (Fig. 153), 2 = membranous (Figs. 116, 127, 139). The separate and sclerotized median apophysis is most common in the Pisauridae and the outgroups.

Character 39: Distal apophysis; 0 = present (e.g., Figs. 5, 68, 83, 101, 138, 146, 153), 1 = reduced (e.g., Figs. 42, 173).

Character 40: Distal apophysis; 0 = separate and sclerotized with basal membrane connected with tegulum (e.g., Figs. 5, 101, 138, 146), 1 = continuous projection of tegulum (Figs. 68, 153), 2 = membranous (Fig. 83). The membranous distal apophysis is present only in *Hygropoda higenaga*.

Character 41: Saddle; 0 = absent, 1 = present in *Dolomedes* (e.g., Fig. 42).

Character 42: Fulcrum; 0 = absent, 1 = present in *Dolomedes*, *Qianlingula* and *Thalassius* (e.g., Figs. 28, 42, 154, 155, 175).

Character 43: Conductor; 0 = distinct (e.g., Figs. 5, 42, 68, 83, 101, 138, 146, 153, 175), 1 = small or reduced in *Hippasa* and *Trechalea* (see Yin et al. 1997: 19, figs. 6g, h; Sierwald 1990: 33, figs. 31–33, 46).

Character 44: Conductor; 0 = slightly sclerotized, translucent or opaque (e.g., Figs. 42, 101, 146, 153, 175), 1 = strongly sclerotized (e.g., Figs. 5, 68, 140), 2 = membranous (Fig. 83). The strongly sclerotized (state 1) and membranous conductor (state 2) are not as common in the Pisauridae as slightly sclerotized, translucent or opaque one.

Character 45: Two guiding lamellae of conductor; 0 = absent, 1 = present in *Polyboea* and *Qianlingula* (Figs. 148, 155).

Character 46: Embolus; 0 = long and thin (e.g., Figs. 7, 68, 103, 140, 148, 155), 1 = medium (e.g., Figs. 21, 33), 2 = short (e.g., Figs. 28, 83, 175). A long and thin embolus is most common in the Pisauridae and is indicated as the primitive condition by Sierwald (1997).

Character 47: Basal projection of embolus; 0 = absent, 1 = present in *Qianlingula bilamellata* (Fig. 155) and *Hygropoda higenaga* (Figs. 83, 85). Embolus lacks basal projection in most species of Pisauridae.

Character 48: Direction of curve of embolus (left bulb, in ventral view); 0 = counterclockwise (e.g., Figs. 5, 101, 138, 146), 1 = clockwise (e.g., Figs. 42, 68, 83, 173). Judg-

ing from the result of cladistic analysis by Griswold (1993), the counterclockwise curving embolus is shared by Pisauridae, Trechaleidae and Lycosidae, and thus it may be the primitive condition.

Behavior: Character 49: Web construction; 0 = adults construct webs for prey capture, 1 = adults hunting without webs.

Character 50: Egg sac carried on spinnerets; 0 = no, 1 = yes, as in lycosids and *Trechalea* (Griswold 1993).

Analysis.—The analysis was carried out using Hennig86 Version 1.5 (Farris 1988) to produce the most-parsimonious trees (MPTs). All resulting trees were forwarded to Winclada (Nixon 1999) to display, reroot and map the characters, and produce rooted trees. All multistate characters were treated unordered (non-additive, implemented with the "ccode-;" command). We obtained 598 MPTs (length = 114, CI = 0.61 and RI = 0.80) by running ie*. These MPTs were subjected to successive character weighting. Characters were reweighted based upon their relative agreement with the cladograms obtained: characters agreeing well with the initial cladograms were given greater weight than those requiring more homoplasy. Three rounds of successive weighting, implemented through the "xsteps w; ie*;" commands produced 12 MPTs (length = 529, CI = 0.82 and RI = 0.93) (character weights are listed in Table 2). Each of the 12 most parsimonious cladograms chosen through successive approximative weighting differed only in the resolution of the five species of the genus *Pisaura* and the seven species of the genus *Dolomedes*. In the strict consensus tree (Fig. 1), some species of the two genera are in an unresolved trichotomy. Optimization of character state changes may differ with the choice of optimization schemes, ACCTRAN or DELTRAN (depicted here in Fig. 1). The discontinuous character state changes are mapped as homoplasy and indicated as white rectangles, non-homoplastic character state changes are indicated as black rectangles). In the following description, only non-homoplastic character state changes supporting a clade under both optimization schemes are discussed unless noted otherwise.

The ingroup (clade A) is defined by the following synapomorphies of non-homoplastic character state changes: subtegulum under the teg-

Table 2.—Character performance.

Character number	Steps	CI	RI	Weight
0	3	0.66	0.75	5
1	2	1.00	1.00	10
2	2	1.00	1.00	10
3	3	0.66	0.00	0
4	1	1.00	1.00	10
5	2	1.00	1.00	10
6	4	0.50	0.80	4
7	8	0.25	0.45	1
8	1	1.00	1.00	10
9	2	0.50	0.00	0
10	2	0.50	0.83	4
11	1	1.00	1.00	10
12	3	0.33	0.00	0
13	1	1.00	1.00	10
14	1	1.00	1.00	10
15	2	1.00	1.00	10
16	1	1.00	1.00	10
17	5	0.60	0.84	5
18	3	0.33	0.60	2
19	2	0.50	0.66	3
20	2	1.00	1.00	10
21	3	0.66	0.85	5
22	2	1.00	1.00	10
23	1	1.00	1.00	10
24	1	1.00	1.00	10
25	3	0.33	0.66	2
26	4	0.25	0.70	1
27	2	0.50	0.50	2
28	2	0.50	0.50	2
29	7	0.42	0.50	2
30	2	0.50	0.80	4
31	1	1.00	1.00	10
32	1	1.00	1.00	10
33	2	0.50	0.90	4
34	1	1.00	1.00	10
35	3	0.33	0.33	1
36	1	1.00	1.00	10
37	1	1.00	1.00	10
38	2	1.00	1.00	10
39	1	1.00	1.00	10
40	2	1.00	1.00	10
41	1	1.00	1.00	10
42	2	0.50	0.88	4
43	1	1.00	1.00	10
44	3	0.66	0.83	5
45	2	0.50	0.00	0
46	4	0.50	0.80	4
47	2	0.50	0.00	0
48	1	1.00	1.00	10
49	4	0.25	0.00	0
50	1	1.00	1.00	10

ulum (ch 33), palpal organ with distinct conductor (ch 43), egg sac not carried on spinneret (ch 50), and—under ACCTRAN optimization—the male palpal organ with distal tegular projection (ch 35), embolus long and thin (ch 46). All Chinese pisaurid genera (clade A) are grouped into two clades (clade B and clade C). The clade B, containing the genera *Polyboea*, *Perenethis*, *Dianpisaura* and *Pisaura* is supported by four synapomorphies of non-homoplastic character state changes: AME equal to ALE (ch 1), epigynum with small anterior depression (ch 15), and under ACCTRAN optimization, less than 60 piriform gland spigots in ALS (ch 10), wide and flat copulatory duct (ch 19). The other Chinese pisaurid genera (*Eurychoera*, *Qianlingula*, *Hygropoda*, *Thalassius* and *Dolomedes*) are grouped in clade C, which is supported by palpal organ with continuous distal apophysis (ch 40) and clockwise curved embolus (ch 48).

The genera *Polyboea* and *Perenethis* (clade D) form the sister group of clade E. The sister group relationship between *Polyboea* and *Perenethis* is supported by four non-homoplastic character state changes: procurved AER (ch 0), chelicera with two retromarginal teeth (ch 6), membranous and saccate copulatory duct (ch 20), and tegulum with basal protuberance (ch 34). The clade E comprises the genera *Dianpisaura* and *Pisaura*, whose sister group relationship is supported by apical division of palpal organ with a bulbous section (ch 36). The genus *Pisaura* is defined by two apomorphies of non-homoplastic character state changes: lateral margins of lateral lobes of epigynum forming several curves (ch 17), and copulatory duct curved with three or more loops (ch 21, reversal in *Pisaura sublama*).

The genera *Eurychoera* and *Qianlingula* (clade F) form the sister group of clade G. The sister group relationship of *Eurychoera* and *Qianlingula* is supported by AME equal to PME (ch 2), MOA as long as wide (ch 3), and under ACCTRAN optimization, median apophysis being a continuous projection of tegulum (ch 38). The clade G is supported by the non-homoplastic synapomorphies: spermatheca with two chambers (ch 22), and under ACCTRAN optimization, the membranous distal apophysis (ch 40), and—under DELTRAN optimization—the arched lateral

margins of lateral lobes (ch 17). The sister group relationship of *Thalassius* and *Dolomedes* (clade H) is supported by two non-homoplastic synapomorphies: spermatheca with accessory bulb (ch 24) and distal apophysis of palpal organ reduced (ch 39). Non-homoplastic apomorphies for the genus *Thalassius* is AME larger than PME (ch 2) and copulatory duct slightly sclerotized (ch 20). The genus *Dolomedes* is defined by five non-homoplastic apomorphies: intromittent orifice at median or posterior part of epigynum (ch 16), spermatheca not inflated (ch 23) and with only one chamber (ch 22), cymbium with basal apophysis (ch 31) and palpal organ with saddle (ch 41).

Sierwald (1997) presented a phylogenetic analysis of the subfamily Pisaurinae, and the result indicated that this subfamily comprises 19 nominal genera (e.g., the genera *Pisaura*, *Perenethis* and *Polyboea* in clade B), which form a monophyletic group. The genus *Eurychoera*, traditionally placed in the subfamily Pisaurinae (Simon 1898; Roewer 1955), was excluded from this subfamily by Sierwald (1997). This point is supported by the result of present cladistic analysis, which indicates that *Eurychoera*, the sister group of the new genus *Qianlingula*, is not closely related to the other pisaurine genera.

The genera *Dolomedes* and *Hygropoda* were previously placed in the subfamily Thaumasiinae and *Thalassius* was placed in the subfamily Thalassiinae (Simon 1898; Roewer 1955). But this cladogram shows that *Dolomedes* has the closest relationship with *Thalassius* and *Hygropoda* is the sister group of the clade (*Thalassius* + *Dolomedes*). Sierwald (1990) studied the male palpal organ morphology of the representative genera of Pisauridae, and found that the palpal organ of *Thaumasia*, type genus of Thaumasiinae, was closely related to those of *Dolomedes* and *Thalassius*. As Sierwald (1990, 1997) pointed out, the traditional subfamilies Thaumasiinae and Thalassiinae of the Pisauridae as established by Simon do not stand up to phylogenetic scrutiny, and the genera listed in the two subfamilies (Roewer 1955) cannot be grouped into monophyletic clades. Thus, further study is badly needed in order to test the monophyly of the two pisaurid subfamilies.

TAXONOMY

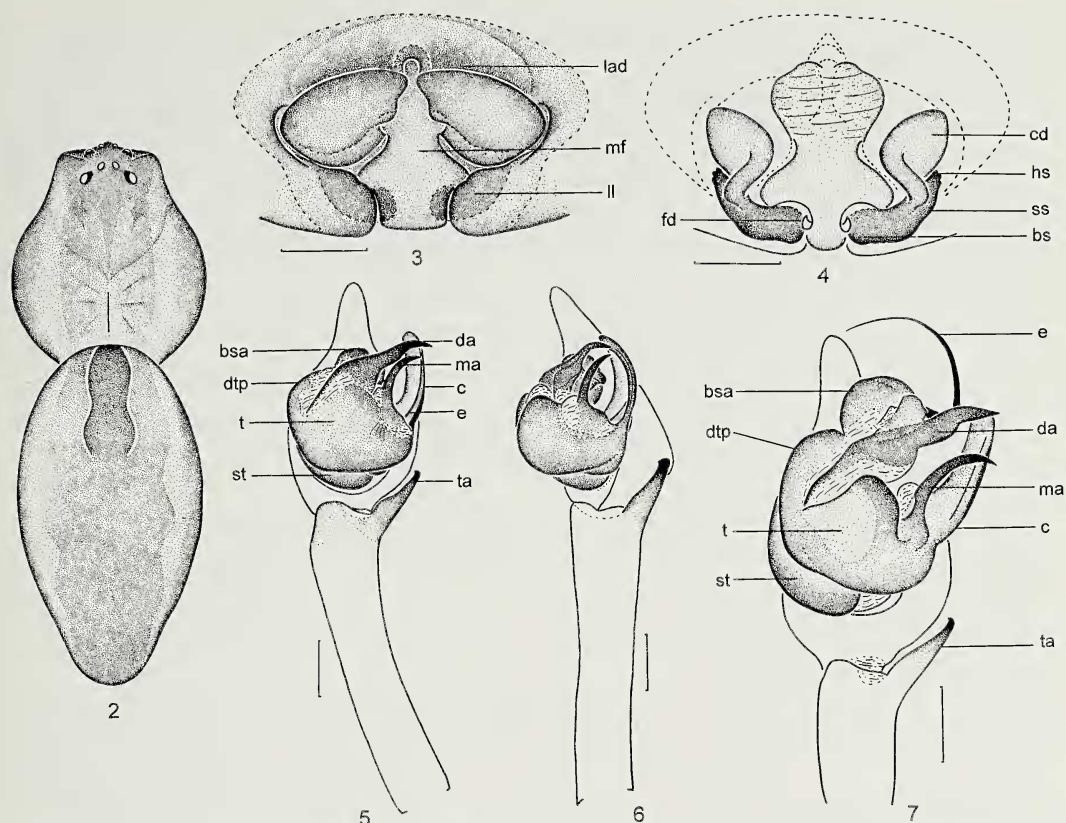
Pisauridae Simon 1890

Pisauridae Simon 1890: 80; Zhu & Shi 1983: 146; Hu 1984: 253; Hu 2001: 217; Song 1987: 204; Chen & Zhang 1991: 221; Barrion & Litsinger 1995: 342; Dippenaar-Schoeman & Jocque 1997: 250; Song et al. 1999: 346; Song et al. 2001: 265.

Type species.—*Pisaura* Simon 1885.

Diagnosis.—The family Pisauridae can be distinguished from both Trechaleidae and Lycosidae by: the nursery web that the female produces surrounded the egg sac, and the egg sac carried underneath the sternum. It differs from Trechaleidae in the median apophysis of the male palp, which is neither large nor distally situated, and lacking a dorsal embolic groove that extends distally into an apical groove and the absence of a "skirt" on the seam of the discoid egg sac (Carico 1993: 230, fig. 6). It can also be distinguished from Lycosidae by the posterior eye row not strongly recurved, and the male palp usually with tibial apophysis.

Description.—Medium-sized to very large, ecribellate and entelegyne spiders. Carapace longer than wide, frequently decorated with light longitudinal bands or dark symmetrical patterns on a brown or gray background. Eight eyes in two (4–4) or three (4–2–2) rows. Clypeus height variable. Chelicera usually stout, with lateral condyle, promargin with 3–4 teeth and retromargin with 2–4 teeth. Labium free, length-width ratio more or less than 1.0. Legs relatively long and spiniferous. Trochanters deeply notched. Tibiae I and II usually with four pairs of ventral spines. Trichobothria present on metatarsi and tarsi. Tarsal organ present on dorsum of tarsi. Tarsi with three dentate claws. Abdomen oval and dark, with longitudinal bands, folium or spots. Six spinnerets; colulus present. Tracheal spiracle located just anterior of colulus. Epigyne always with two integumental folds, forming two lateral lobes and a median field. Copulatory duct sclerotized or membranous. Spermatheca with one, two (head and base) or three (head, stalk and base) chambers. Fertilization duct present. Male palp usually with tibial apophysis, reduced in some species of *Thalassius*. Median



Figures 2-7.—*Dianpisauro lizhii*. 2. Female, dorsal view; 3. Epigynum; 4. Vulva; 5. Left palp of the male, ventral view; 6. Left palp of the male, retrolateral view; 7. Left palp of the male, expanded. Scale lines: 2 = 2 mm; 3-7 = 0.5 mm.

apophysis usually present, reduced in *Eurychoera*. Embolus varies from simple and short to long and curved.

Remarks.—Formerly, the pisaurid genera were grouped into three subfamilies: Pisaurinae, Thaumasiinae and Thalassiinae (Simon 1898; Roewer 1955). The result of a phylogenetic study (Sierwald 1997) indicated that

the subfamily Pisaurinae, containing 19 pisaurid genera is a monophyletic clade, and the defining characters for it were presented. Unfortunately, the monophyly of the other two subfamilies is so poorly substantiated that recent catalogs (Platnick 1989, 1993, 1997, 2002) listed pisaurid genera without reference to subfamilies.

KEY TO CHINESE PISAURID GENERA

1. AME smaller or equal to ALE; copulatory duct of female epigynum coiled (Figs. 4, 100, 115, 145); distal apophysis of papal organ larger than median apophysis (Figs. 5, 101, 116, 146) 1
- AME larger than ALE; copulatory duct of female epigynum not distinctly coiled (Figs. 32, 67, 81, 152, 166); distal apophysis of palpal organ absent (Figs. 42, 173), or small (Figs. 68, 83, 153) 5
2. Anterior eye row almost straight or slightly recurved; chelicera with three retromarginal teeth; copulatory duct of female epigynum sclerotized and not saccate (Figs. 4, 137); tegulum of palpal organ lacking basal protuberance (Figs. 5, 138) 3
- Anterior eye row procurved; chelicera with two retromarginal teeth; copulatory duct of

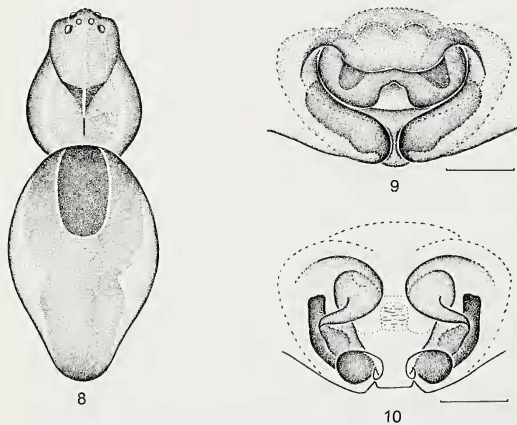
- female epigynum membranous and saccate (Figs. 100, 145); tegulum of palpal organ with a basal protuberance (Figs. 101, 146) 4
3. Dorsum of abdomen with a large fuscous patch in anterior part (Fig. 2); epigynum with large anterior depression (Fig. 3); copulatory duct short and thick (Fig. 4); male palpal tibia longer than cymbium, embolus not accompanied by membrane (Figs. 5–7) *Dianpisaura*
 Dorsum of abdomen lacking large fuscous patch in anterior part; anterior depression of epigynum small and fossa-shaped (Fig. 136); copulatory duct slender (Fig. 137); male palpal tibia shorter than cymbium, embolus accompanied by membrane (Figs. 138–140) ... *Pisaura*
4. AME equal to ALE; ventral tibia with a pair of distal short spines; carina of epigynum separated (Fig. 99); conductor of palpal organ small (Figs. 101–103) *Perenethis*
 AME smaller than ALE; ventral tibia lacking a pair of distal short spines; carina of epigynum entire (Fig. 144); conductor of palpal organ large, with two guiding lamellae (Figs. 146–148) *Polyboea*
5. Chelicera with four retromarginal teeth; intromittent orifice located at the median or posterior part of epigynum; spermatheca long and coiled (Fig. 41); palpal organ with saddle (Fig. 42) *Dolomedes*
 Chelicera with three retromarginal teeth; intromittent orifice located at the anterior part of epigynum; spermatheca inflated and short; palpal organ lacking saddle 6
6. Anterior eye row almost straight; clypeus height shorter or slightly longer than AME diameter; palpal organ lacking fulcrum 7
 Anterior eye row recurved; clypeus height much longer than AME diameter; palpal organ with fulcrum (Figs. 155, 175) 8
7. Tarsus of leg not flexible; lateral lobe of epigynum with a basal oblique rumple (Fig. 66); conductor of palpal organ sclerotized (Figs. 68–70) *Eurychoera*
 Tarsus of leg long and flexible; epigynum otherwise; conductor of palpal organ membranous (Figs. 83–85) *Hygropoda*
8. Median field of epigynum strongly sclerotized (Fig. 151); palpal organ with distal apophysis, embolus slender and flagelliform, conductor large, with two guiding lamellae (Figs. 153–155) *Qianlingula*
 Median field of epigynum not sclerotized (Fig. 165); palpal organ lacking distal apophysis, embolus short, conductor small and lacking guiding lamellae (Figs. 173–175) *Thalassius*

Dianpisaura new genus

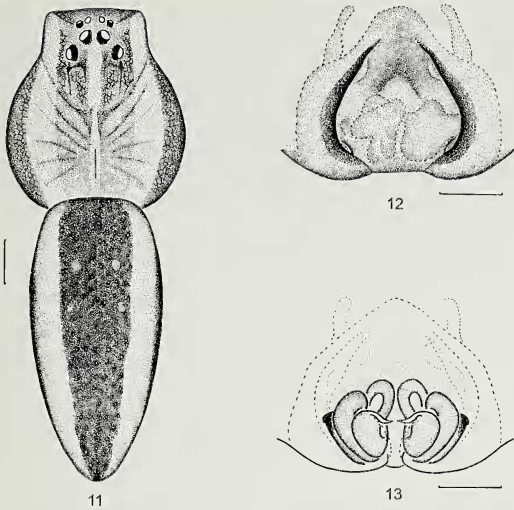
Type species.—*Pisaura lizhii* Zhang 2000.

Diagnosis.—The new genus is closely related to *Pisaura*, but can be distinguished by: the presence of a fuscous patch at the anterior part of dorsum of abdomen; the presence of 6–8 dorsal spines on palpal femur; the reduced base of the PI on the ALS (Fig. 178); the presence of one or two large depressions at the anterior part of epigynum (Figs. 3, 9); the short and wide epigynal copulatory duct (Fig. 4); the long male palpal tibia (longer than cymbium) and the absence of embolic membrane (Figs. 5–7). The adults of the type species *D. lizhii* (Zhang 2000) was found building funnel-webs in the bush rather than hunting in the vegetation.

Description.—Body medium to large. Carapace red brown. Anterior eye row slightly re-



Figures 8–10.—*Dianpisaura songi*. 8. Female, dorsal view; 9. Epigynum; 10. Vulva. Scale lines: 8 = 2 mm; 9, 10 = 0.5 mm.



Figures 11–13.—*Dolomedes chinensis*. 11. Female, dorsal view; 12. Epigynum; 13. Vulva. Scale lines: 11 = 2 mm; 12, 13 = 0.5 mm.

curved, posterior row strongly recurved and wider than anterior row. Posterior eyes larger than anterior eyes. Palpal femur with 6–8 dorsal spines. Chelicera stout, with three teeth on

both margins. Labium wider than long. Legs long and spinous. Tibiae I and II with four pairs of ventral spines; tibiae III and IV with three pairs of ventral spines. Metatarsus and tarsus with dorsal trichobothria. Tarsus of leg with three claws, unpaired claw with two teeth. Dorsum of abdomen with a fuscous patch at the anterior part. Epigynum strongly sclerotized, with one or two large anterior depressions, lateral lobes anteriorly separated; spermatheca with head, stalk and base, copulatory duct short and wide. Male palpal tibia longer than cymbium, with lateral apophysis; conductor sheet and situated at the base of the tegulum; median apophysis sclerotized, much smaller than distal apophysis, both with basal membrane connecting with the tegulum; distal end of the tegulum extending ahead, forming the distal tegular projection, which connected with the bulbous section of apical division; embolus long and lacking an associated membrane.

Etymology.—“Dian” is an alternative name in Chinese for the Yunnan Province; feminine in gender.

KEY TO CHINESE *DIANPISAURA* SPECIES

- 1. Female 2
 Male; Palpal tibia longer than cymbium; median apophysis sclerotized and crescent-shaped, embolus not accompanied by membrane (Figs. 5–7) *D. lizhii*
- 2. Lateral margins of abdominal fuscous patch concave (Fig. 2); median field of epigynum with a pair of sclerotized plates, posterior margin wide (Fig. 3); base of spermatheca not inflated (Fig. 4) *D. lizhii*
 Lateral margins of abdominal fuscous patch parallel (Fig. 8); median field of epigynum with a transverse sclerotized plate, with a central depression, posterior margin narrow (Fig. 9); base of spermatheca inflated and round (Fig. 10) *D. songi*

Dianpisaura lizhii (Zhang 2000) new combination
 Figs. 2–7, 176–181

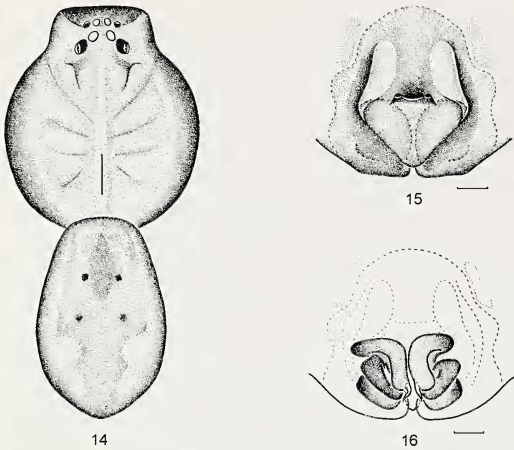
Pisaura lizhii Zhang 2000: 4, figs. 3A–D (female holotype from Yunnan, China, in MHU, examined).

Material examined.—Holotype female, no precise details, Yunnan, China, 6 June 1984, L.Z. Zhang (MHU). CHINA: 4 ♀, Mengla, Yunnan: 8 July 1981, J.F. Wang (MHU); 2 ♀, 1 ♂, Mengla, 24 May 2000, D. Q. Li (MHU); 3 ♀, Mengla, 27 July 2000, J. X. Zhang (MHU); 3 ♀, Menglun County, 30 June 2001, C. Zhang, D. Q. Li (MHU).

Diagnosis.—This species is similar to *D. songi* but can be distinguished by concave lateral margins of the fuscous patch on the dorsum of the abdomen (Fig. 2); the presence of a pair of sclerotized plates on median field of epigynum; the wide posterior margin of the median field, and the spermathecal base that is not distinctly inflated (Figs. 3–4).

Female.—Described by Zhang (2000).

Male.—Total length 10.80: cephalothorax 4.50 long, 3.69 wide; abdomen 6.53 long, 3.02 wide. Carapace red brown, covered with dark brown fine hairs, with a wide orange band near each of the lateral margins. Anterior



Figures 14–16.—*Dolomedes costatus*. 14. Female, dorsal view; 15. Epigynum; 16. Vulva. Scale lines: 14 = 2 mm; 15, 16 = 0.5 mm.

eye row slightly recurved, and posterior eye row strongly recurved. Posterior eyes larger than anterior eyes. Chelicera dark red brown, with three teeth on both margins. Labium and endites red brown. Legs dark yellow brown, with hairs and spines. Measurements of palp and legs: palp 8.55 (3.60, 1.17, 2.34, 1.44); leg I 23.63 (7.02, 8.10, 5.85, 2.66), II 22.46 (6.30, 7.74, 5.85, 2.57), III 19.59 (5.49, 7.12, 4.86, 2.12), IV 24.13 (6.57, 7.47, 7.16, 2.93). Leg formula: 4, 1, 2, 3. Dorsum of abdomen gray brown, with a dark brown patch at the center of the anterior part; venter yellow brown. Palpal tibia much longer than cymbium, distal end of tibial apophysis with a small hook; subtegulum partly visible in ventral view; median apophysis sclerotized and crescent-shaped; embolus long and not accompanied by membrane (Figs. 5–7).

Distribution.—China (Yunnan).

Dianpisaura songi (Zhang 2000) new combination
Figs. 8–10

Pisaura songi Zhang 2000: 5, figs. 5A–C (holotype female, 1 female paratype from Menglun, Yunnan, China, in MHU, examined).

Material examined.—Holotype female, Menglun, Yunnan, China, 11 November 1988, D.X. Song (MHU); 1 female paratype, Menglun, Yunnan, China, 15 November 1988, D.X. Song (MHU).

Diagnosis.—Body shape and patches are similar to those of *D. lizhii*, but it differs from

the latter by lateral margins of the fuscous patch on the dorsum of the abdomen almost parallel (Fig. 8); sclerotized plate of the median field of the epigynum transverse, with a depression at the center; base of spermatheca inflated and round (Figs. 9–10).

Female.—Described by Zhang (2000).

Male.—Unknown.

Distribution.—China (Yunnan).

Dolomedes Latreille 1804

Dolomedes Latreille 1804: 135; Carico 1973: 448; Hu 1984: 254; Chen & Zhang 1991: 222; Song et al. 2001: 266.

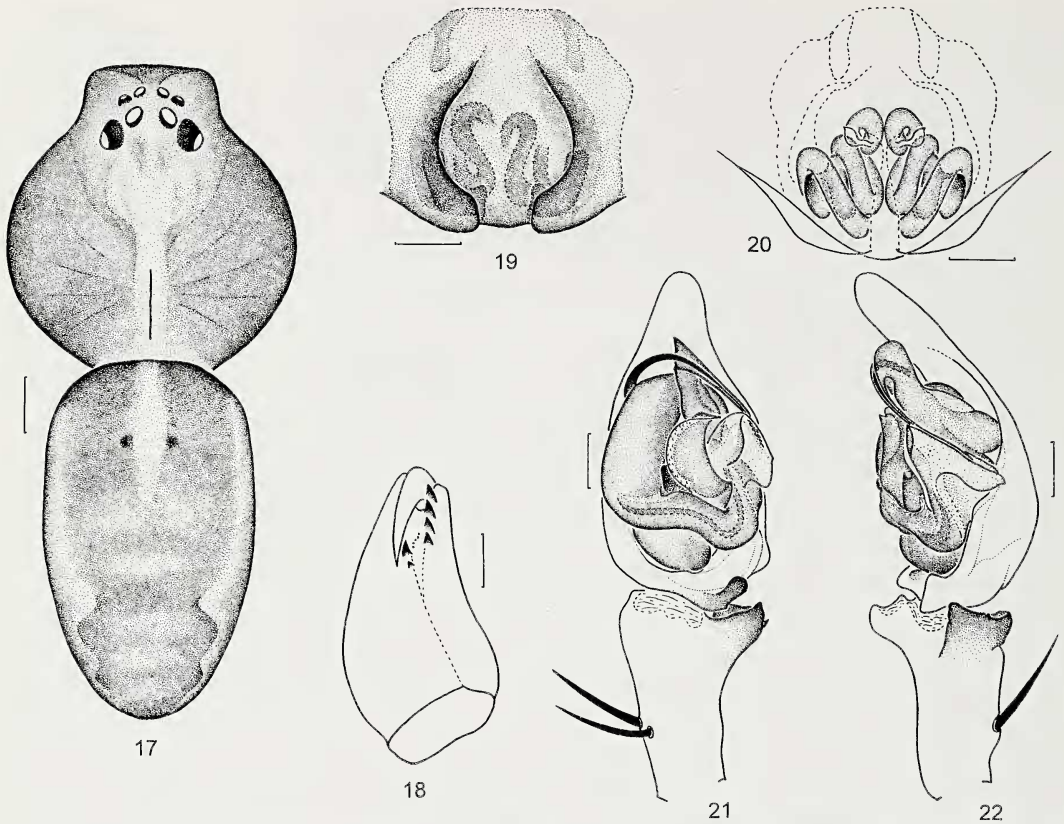
Type species.—*Araneus fimbriatus* Clerck 1757, by subsequent designation of Walckenaer (1805).

Diagnosis.—The genus is closely related to *Bradystichus* Simon 1884 from New Caledonia in eye pattern, cheliceral teeth, shape of the female and male copulatory organs (Platnick & Forster 1993), but can be distinguished from the latter by femora I, II and III with five prolateral and retrolateral spines respectively; spermatheca of the female with a basal accessory bulb (Fig. 32); and base of the median apophysis of the male palpal organ lacking hooked projection (Fig. 42).

Remarks.—This large genus of about 100 species is distributed in Asia (38 species), Africa (24 species), America (13 species), Oceania (13 species), Australia (7 species) and Europe (6 species). Among them, 16 species and one subspecies have been reported from China (Song et al. 1999), of which *D. angustivirgatus* Kishida 1936 has been synonymized with *D. sulfureus* L. Koch 1877 (Yaginuma 1986); *D. cordivulva* Strand 1907 has been considered as a nomen dubium (Platnick 2002); *D. chinesis* *duoformis* Fox 1936 (Sichuan), *D. plantarius* (Clerck 1757) (Xinjiang), *D. fimbriatus* (Clerck 1757) (Hebei) and *D. fimbriatoides* Bösenberg & Strand 1906 (Hunan, Sichuan) were listed as species inquirendae by Song et al. (1999); *D. insurgens* Chamberlin 1924 and *D. pallitarsis* Dönitz & Strand 1906 (in Bösenberg & Strand 1906) are both synonymized with *D. saganus* Bösenberg & Strand 1906 in this study; *D. horishanus* Kishida 1936 is considered a nomen dubium as the original description did not show its differences from other species in the genus and the type specimens may be lost (Dr. A. Tanikawa, in litt.). The other eight species and an additional two new species are reported here.

KEY TO CHINESE *DOLOMEDES* SPECIES

1. Female 2
Male 11
2. Lateral margins of lateral lobes of epigynum almost parallel (Figs. 31, 36) 3
Lateral margins of lateral lobes of epigynum arched (Figs. 12, 46) 4
3. Median field of epigynum longer than wide (Fig. 36); copulatory duct short, spermatheca thick (Fig. 37) *D. raptoroides*
Median field of epigynum wider than long (Fig. 31); copulatory duct long, spermatheca thin (Fig. 32) *D. raptor*
4. Chelicera with two promarginal teeth and 4–5 denticles (Fig. 18); spermatheca long and strongly coiled (Fig. 20) *D. mizhoanus*
Chelicera with three promarginal teeth 5
5. Median field of epigynum almost entirely dark in color 6
Median field of epigynum not entirely dark in color 7
6. Posterior margin of median field truncate (Fig. 12); spermatheca pointing at front and inflated at the tip (Fig. 13) *D. chinensis*
Posterior margin of median field round (Fig. 58); spermatheca pointing at back and not inflated at the tip (Fig. 59) *D. sulfureus*
7. Posterior part of carapace and anterior part of abdomen both with a pair of large fuscous patches (Fig. 23); posterior margin of median field tongue-shaped (Fig. 24); spermatheca thin and long (Fig. 25) *D. nigrimaculatus*
Carapace and abdomen lacking large fuscous patch; epigynum otherwise 8
8. Median field of epigynum extruded like an eave at the center (Fig. 15) *D. costatus*
Median field of epigynum otherwise 9
9. Fuscous region in median field not broadened at anterior part (Fig. 51) *D. stellatus*
Fuscous region in median field broadened at anterior part 10
10. Median field of epigynum rhomboid, with posterior margin not reaching genital groove (Fig. 46) *D. senilis*
Median field of epigynum not rhomboid, with posterior margin slightly surpassing genital groove (Figs. 39, 40) *D. saganus*
11. Basal cymbial apophysis of palpal organ not distinct 12
Basal cymbial apophysis of palpal organ distinct and hook-shaped 14
12. Palpal tibia half of cymbium, tibial apophysis wide, with three branches in lateral view (Figs. 33, 34) *D. raptor*
Palpal tibia longer than half of cymbium, tibial apophysis narrow, with two branches in lateral view 13
13. Posterior part of carapace and anterior part of abdomen both with a pair of large fuscous patches; palpal tibia longer than cymbium, tip of median apophysis surpassing the top of embolus (Figs. 26, 27) *D. nigrimaculatus*
Carapace and abdomen lacking large fuscous patch; palpal tibia shorter than cymbium, tip of median apophysis not surpassing the top of embolus (Figs. 53, 54) *D. stellatus*
14. Palpal tibial apophysis not branched, distal tegular projection almost two times as wide as tegulum (Figs. 21, 22) *D. mizhoanus*
Palpal tibial apophysis branched, distal tegular projection only slightly wider or as wide as tegulum 15
15. Tip of median apophysis not reaching the top of fulcrum, tibial apophysis at the median of palpal tibia (Figs. 48, 49) *D. senilis*
Tip of median apophysis reaching the top of fulcrum, tibial apophysis at the distal end of palpal tibia 16
16. Base of basal cymbial apophysis attenuated, embolus extended from outside of fulcrum (Figs. 60, 61) *D. sulfureus*
Base of basal cymbial apophysis not attenuated, embolus extended from dorsal surface of fulcrum (Figs. 42, 43) *D. saganus*



Figures 17–22.—*Dolomedes mizhoanus*. 17. Female, dorsal view; 18. Left chelicera, prolateral view; 19. Epigynum; 20. Vulva; 21. Left palp of the male, ventral view; 22. Left palp of the male, retrolateral view. Scale lines: 17 = 2 mm; 18 = 1 mm; 19–22 = 0.5 mm.

Dolomedes chinensis Chamberlin 1924
Figs. 11–13

Dolomedes chinensis Chamberlin 1924: 26, pl. 6, fig. 42 (holotype female from Suzhou, Jiangsu, China, in National Museum of Natural History, Smithsonian Institution, examined by Song 1988); Yin et al. 1980: 175, figs. 95a–c; Song 1988: 132, figs. 12A–B; Song et al. 1999: 347, figs. 202K–L.

Dolomedes chinsus: Wang 1981: 125, figs. 65A–B (lapsus for *D. chinensis*).

Dolomedes chinensis: Hu 1984: 255, figs. 267.1–3; Guo 1985: 132, figs. 2–68.1–2 (lapsus for *D. chinensis*).

Material examined.—CHINA: *Yunnan*: Limaoba, 29 September 1977, 1 ♀, MHU.

Diagnosis.—This species resembles *D. sulfureus* in the epigynal shape, but it differs from the latter in: posterior margin of the median field of the epigynum truncate (Fig. 12);

tip of the spermatheca inflated and pointing at the front (Fig. 13).

Female.—Described by Yin et al. (1980) and Song (1988). Median field of the epigynum swollen at the anterior part, posterior margin wide; tip of the spermatheca inflated.

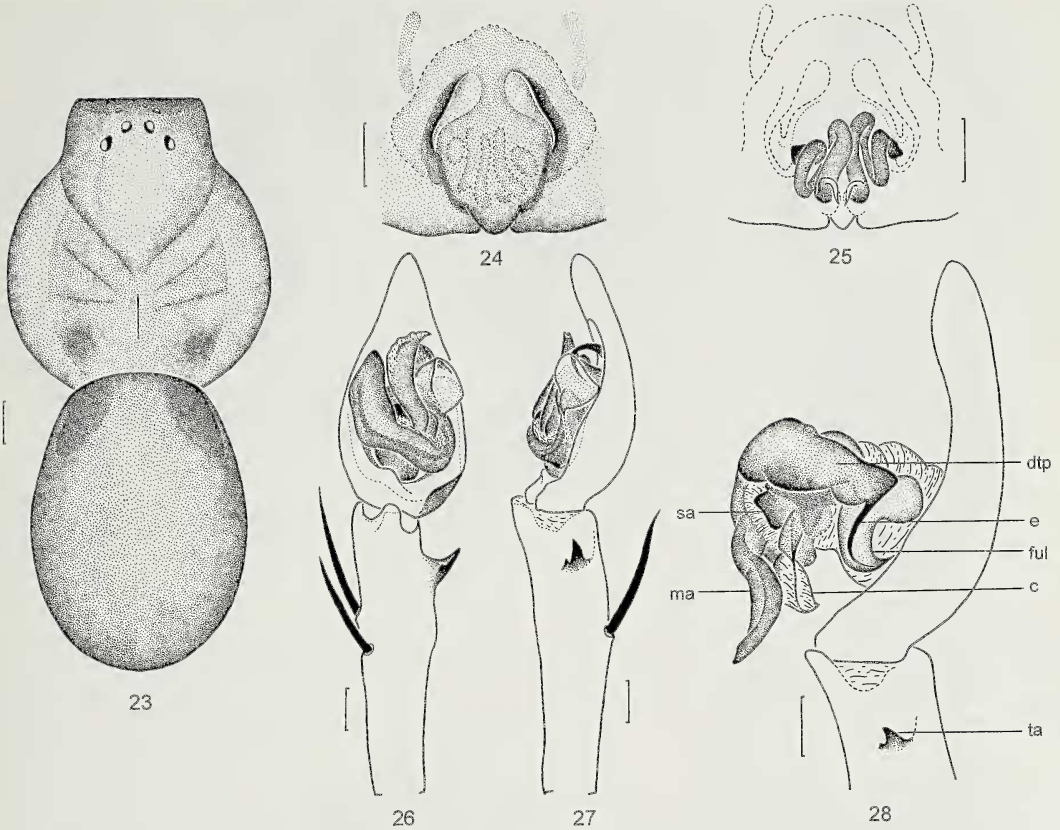
Male.—Unknown.

Distribution.—China (Jiangsu, Hubei, Hunan, Guangdong, Guizhou, Yunnan, Shaanxi).

Dolomedes costatus new species
Figs. 14–16

Material examined.—Holotype female, Chengbu (26°18'N, 110°18'E), Hunan, China, 26 July 1982, J.F. Wang (MHU).

Diagnosis.—The new species resembles *D. stellatus*, but it differs from the latter in: dorsum of the abdomen with an oval dark brown patch (Fig. 14); median field of the epigynum extruded like an eave at the center (Fig. 15);



Figures 23–28.—*Dolomedes nigrimaculatus*. 23. Female, dorsal view; 24. Epigynum; 25. Vulva; 26. Left palp of the male, ventral view; 27. Left palp of the male, retrolateral view; 28. Left palp of the male, expanded. Scale lines: 23 = 2 mm; 24–28 = 0.5 mm.

spermatheca longer than that of the latter (Fig. 16).

Female.—Total length 24.00: cephalothorax 14.00 long, 10.00 wide; abdomen 12.00 long, 8.00 wide. Carapace dark red brown with two narrow yellowish bands laterally and one mesally. Chelicerae dark red. Labium, endites dark red brown and lighter distally. Sternum red brown. Legs red brown dorsally scattered with yellow brown spots. Abdomen light brown, dorsum with a yellowish brown “II”-shaped streak and an oval dark brown patch at the anterior part, and two pairs of dark brown spots at the center. Chelicerae with three teeth on promargin and four on retro-margin. Anterior eye row slightly recurved and posterior eye row recurved. AME–AME: AME–ALE (0.24:0.24), PME–PME:PME–PLE (0.44:0.85); AME:ALE: PME:PLE (0.48: 0.31:0.65:0.63). MOA 1.38 long, front width 1.05, back width 1.63. Measurements of legs: I 49.46 (13.32, 18.90, 10.89, 6.35), II 50.09

(13.68, 18.99, 11.12, 6.30), III 46.04 (12.78, 17.28, 10.80, 5.18), IV 54.54 (13.68, 19.71, 14.40, 6.75). Leg formula: 4, 2, 1, 3. Tibiae I and II with four pairs of ventral spines, III and IV with three pairs respectively. Median field of the epigynum extruded like an eave at the center; spermatheca long and coiled.

Male.—Unknown.

Etymology.—The specific name is from the Latin *costatus*, and refers to the median field of the epigynum extruded like an eave at the center.

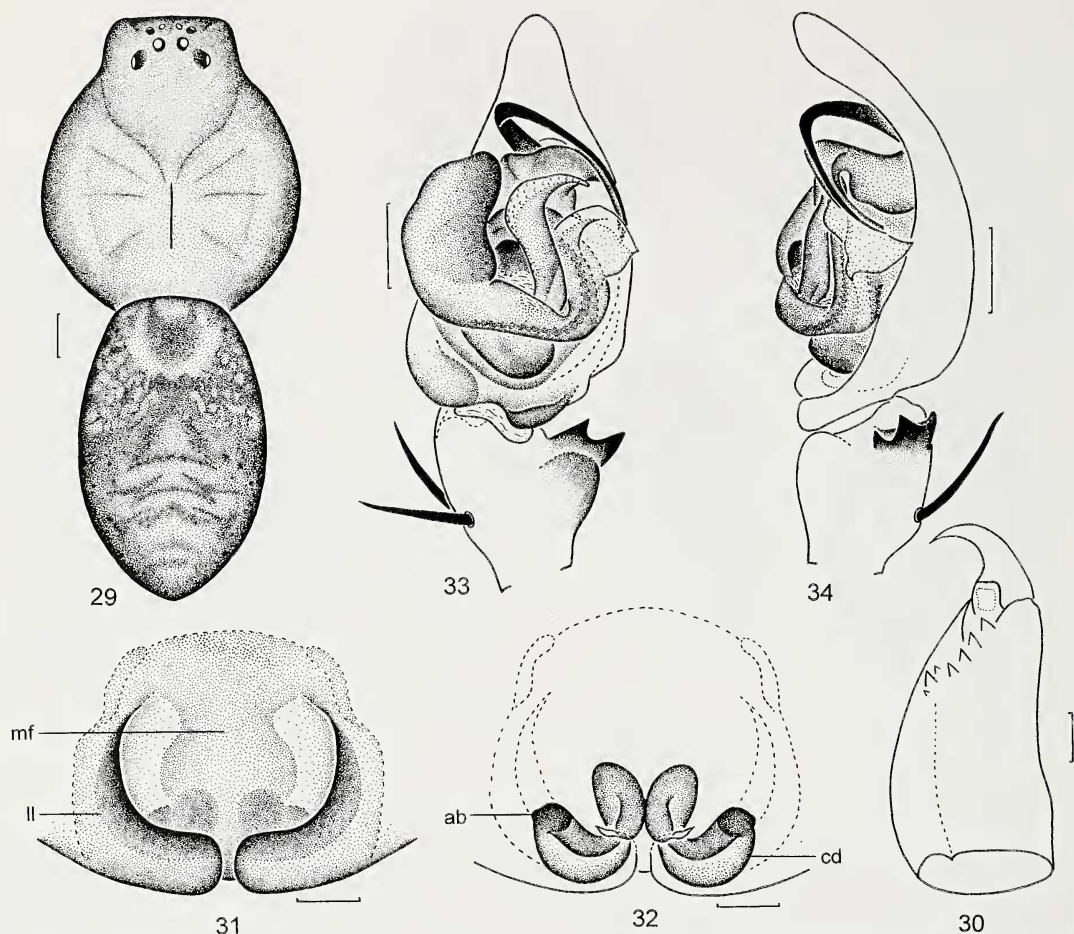
Distribution.—China (Hunan).

Dolomedes mizhoanus Kishida 1936
Figs. 17–22

Dolomedes mizhoanus Kishida 1936: 120, pl. 13, fig. 10 (holotype female from Mizho, Taiwan, presumably lost).

Dolomedes mizuhoanus: Brignoli 1983: 466 (lapsus for *D. mizhoanus*).

Material examined.—CHINA: Hunan: 1



Figures 29–34.—*Dolomedes raptor*. 29. Female, dorsal view; 30. Left chelicera, prolateral view; 31. Epigynum; 32. Vulva; 33. Left palp of the male, ventral view; 34. Left palp of the male, retrolateral view. Scale lines: 29 = 2 mm; 30 = 1 mm; 31–34 = 0.5 mm.

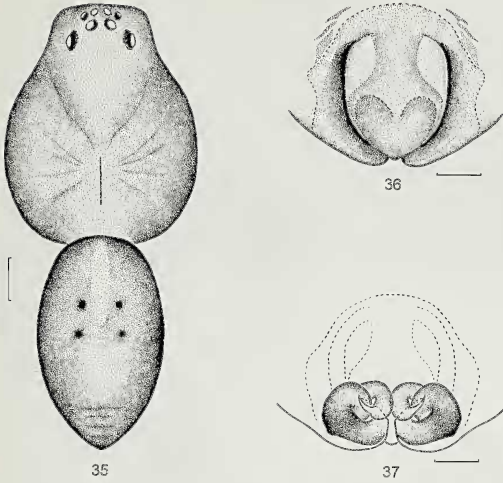
♀, 2 ♂, Chengbu, 26 July 1982, J.F. Wang (MHU); *Yunnan*: 1 ♀, (no details), 6 June 1984, L.Z. Zhang (MHU); *Hainan*: 1 ♀, Wuzhi Mt., Qiongzong, 27 June 1984, M.Y. Liu (MHU); *Guangxi*: 1 ♀, Shuolong, Daxin, 20 August 2000, F.X. Liu (LSHU); *Taiwan*: 1 ♀, Nanren Mt., Pingdong, 24 September 2000, Z.X. Gu (BTU); 1 ♀, Nanren Mt., Pingdong, 28 April 2001, P.L. Dai (BTU); *Yunnan*: 1 ♀, Menglun, 3 July 2001, C. Zhang (MHU).

Diagnosis.—This species is similar to *D. raptor*, but it differs from the latter in: chelicera with two promarginal teeth and 4–5 denticles (Fig. 18); median field of the epigynum narrow (Fig. 19); spermatheca long and coiled (Fig. 20); tibial apophysis of the male palp not branched in lateral view; fulcrum large, with

the top surpassing that of the embolus (Figs. 21, 22).

Female.—Described by Kishida (1936). Chelicera with 2 teeth and 4–5 denticles on promargin. Posterior margin of the median field of the epigynum wide; spermatheca long and coiled.

Male.—Total length 10.40–14.09. One specimen total length 10.40: cephalothorax 5.40 long, 5.20 wide; abdomen 5.67 long, 2.70 wide. Measurements of palp and legs: palp 9.45 (3.78, 1.35, 1.44, 2.88); leg I 37.09 (9.54, 12.15, 10.13, 5.27), II 36.50 (10.22, 11.88, 9.45, 4.95), III 27.91 (7.83, 9.72, 6.98, 3.38), IV 34.84 (9.45, 11.12, 9.23, 5.04). Leg formula: 1, 2, 4, 3. Tibial apophysis of the palp short and wide not branched in lateral



Figures 35–37.—*Dolomedes raptoroides*. 35. Female, dorsal view; 36. Epigynum; 37. Vulva. Scale lines: 35 = 2 mm; 36, 37 = 0.5 mm.

view; fulcrum large, with the top surpassing that of the embolus.

Distribution.—China (Hunan, Guangxi, Hainan, Yunnan, Taiwan).

Dolomedes nigrimaculatus Song & Chen
1991

Figs. 23–28, 182–187

Dolomedes nigrimaculatus Song & Chen 1991: 15, figs. 1–4 (holotype female, allotype male from Tianmu Mt., Zhejiang, China, in MHU, examined); Song et al. 1999: 347, figs. 202M–N, 203F–G.

Dolomedes nigramaculatus: Chen & Zhang 1991: 222, figs. 229.1–4 (lapsus for *D. nigrimaculatus*).

Material examined.—Holotype female, allotype male, Tianmu Mt., Zhejiang, China, 16 July 1981, Z.F. Chen (MHU); CHINA: *Hunan*: 1 ♀, 1 ♂, Zhangjiajie, Dayong, 20 July 1981, J.F. Wang (MHU); 2 ♀, 3 ♂, Nanhua Mt., Fenghuang, 24 July 2001, Z.S. Zhang & J.X. Zhang (MHU); *Hebei*: 1 ♂, Bailuquan, Shijiazhuang, 4 August 1986 (MHU); *Guizhou*: 1 ♂, Fanjing Mt., 3 August 2001, H.X. Wu (MHU).

Diagnosis.—This species can be easily distinguished from others of the genus by the posterior part of the carapace and anterior part of the abdomen with a pair of large dark colored patches (Fig. 23). It is similar to *D. stellatus* in the shape of male palpal organ, but differs from the latter in: posterior margin of the median field of the epigynum tongue-

shaped (Fig. 24); spermatheca long (Fig. 25); tibia of the male palp longer than cymbium; top of the median apophysis extended beyond that of embolus (Figs. 26, 27).

Female.—Described by Song & Chen (1991). Posterior margin of the median field of the epigynum tongue-shaped; spermatheca long and coiled with the accessory bulb located at the outer surface.

Male.—Described by Song & Chen (1991). Palpal tibia longer than cymbium, tibial apophysis with two branches; tip of the median apophysis not smooth; basal apophysis of cymbium not distinct.

Distribution.—China (Hebei, Zhejiang, Hunan, Guizhou).

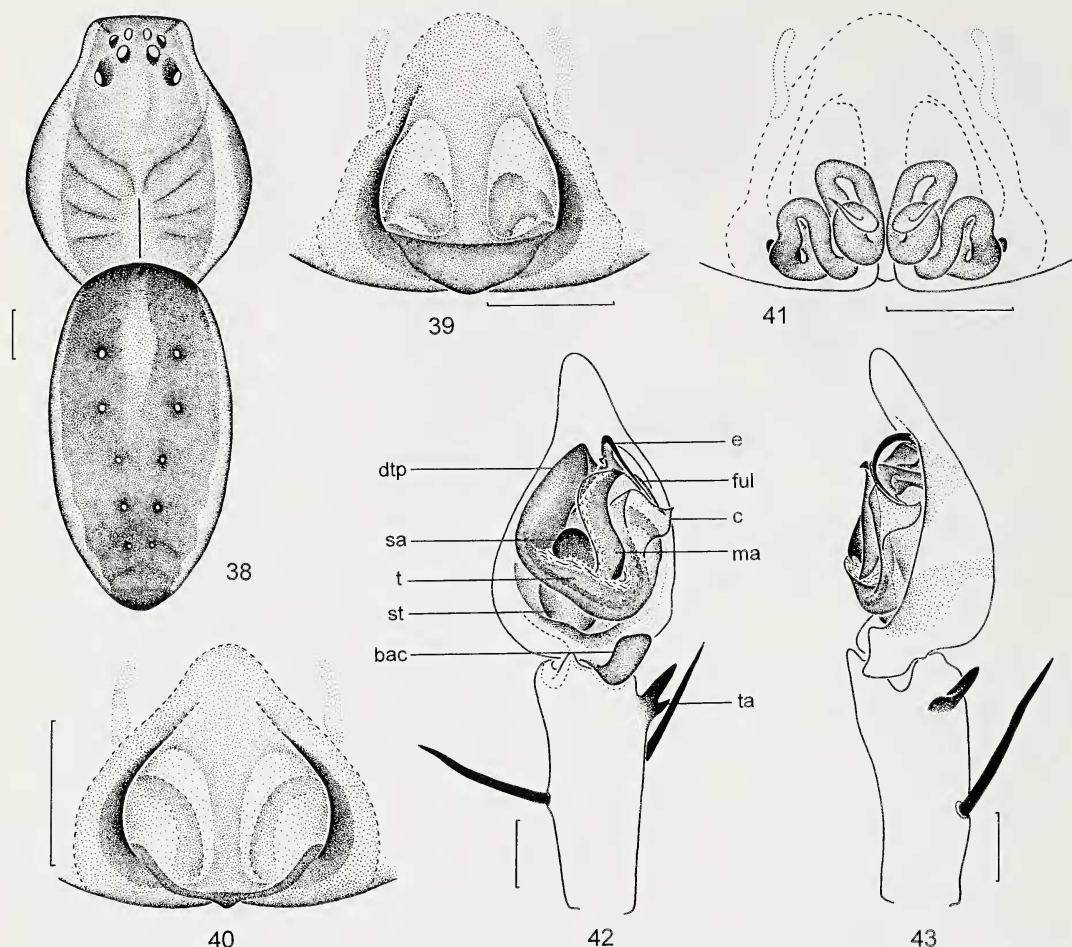
Dolomedes raptor Bösenberg & Strand 1906
Figs. 29–34, 188–193

Dolomedes raptor Bösenberg & Strand 1906: 309, pl. 8, fig. 119, pl. 13, fig. 342 (holotype female from Japan, in Hamburg Museum, not examined); Paik 1969: 42, figs. 7, 46–47; Yaginuma 1986: 172, fig. 95.3; Chikuni 1989: 107, fig. 5; Song et al. 1999: 348.

Material examined.—CHINA: *Shaanxi*: 1 ♀, Baoji, 19 September 1980 (MHU); 2 ♀, 1 ♂, Huayin, 8 May 1981 (MHU); 2 ♂, Louguantai, Zhouzhi, 19 May 1981, M.S. Zhu (MHU); *Zhejiang*: 1 ♀, Tianmu Mt., 16 July 1981, Z.F. Chen (MHU); *Guizhou*: 1 ♀, Mao-lan National Natural Reserve, Libo, 2 August 1995, H.M. Chen (MHU); 1 ♀, Chishui Natural Reserve, 27 May 2000, H.M. Chen (MHU).

Diagnosis.—This species is similar to *D. mizhoanus* in the shape of body and epigynum, but it differs from the latter in: chelicera with three teeth on promargin (Fig. 30); median field of the epigynum wide (Fig. 31); spermatheca short (Fig. 32); tibial apophysis of the male palp with three branches in lateral view; fulcrum not surpassing the top of the embolus (Figs. 33, 34). It is also similar to *D. yawatai* Ono 2002 (Ono 2002: 55, figs. 12–17), but differs in the shape of the tibial apophysis of male palp (Figs. 33, 34), and spermatheca of the female genitalia shorter than that of the latter (Fig. 32).

Female.—Described by Paik (1969), Yaginuma (1986) and Chikuni (1989). Median field of the epigynum wide, its center dark in color, and with variations in its width; acces-



Figures 38–43.—*Dolomedes saganus*. 38. Female, dorsal view; 39. Epigynum; 40. Epigynum, different individual; 41. Vulva; 42. Left palp of the male, ventral view; 43. Left palp of the male, retrolateral view. Scale lines: 38 = 2 mm; 39–43 = 0.5 mm.

sory bulb located at the outer surface of the spermatheca.

Male.—Described by Yaginuma (1986) and Chikuni (1989). Tibial apophysis of male palp thick, with three branches in lateral view; basal apophysis of cymbium small; embolus flagelliform.

Distribution.—China (Zhejiang, Guizhou, Shaanxi); Japan, Korea, Russia.

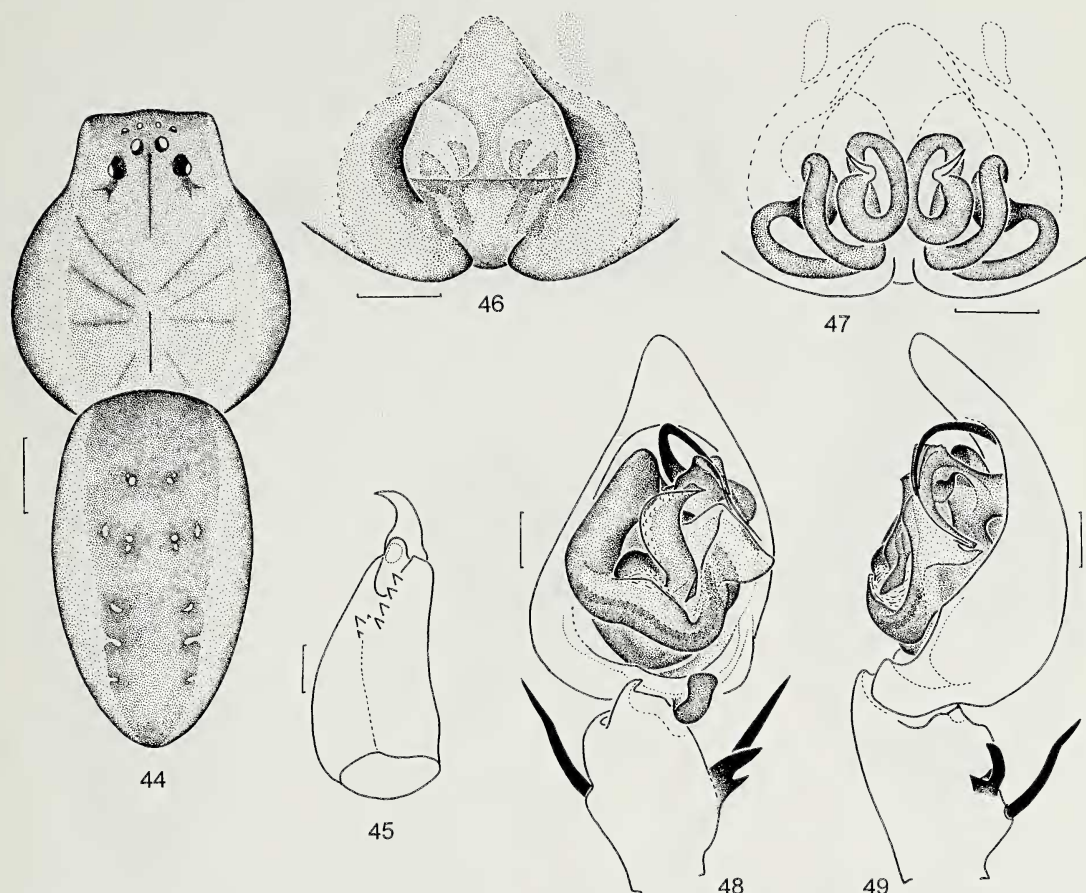
Dolomedes raptoroides new species
Figs. 35–37

Material examined.—Holotype female from Menglun (21°55'N, 101°15'E), Yunnan, China, 6 July 2001, C. Zhang (MHU).

Diagnosis.—The new species is similar to *D. raptor*, but it differs from the latter in: median field of the epigynum longer than wide

(Fig. 36); copulatory duct short and spermatheca thick (Fig. 37).

Female.—Total length 20.93; cephalothorax 11.93 long, 9.72 wide; abdomen 9.68 long, 5.76 wide. Carapace red brown. Chelicerae dark red brown. Labium and endites red brown. Sternum and dorsal legs reddish brown. Dorsum of abdomen dark brown, with two pairs of black brown spots; venter with a mesal brown band. Chelicerae with three teeth on promargin and four on retromargin. Anterior eye row almost straight and posterior eye row recurved. AME–AME:AME–ALE (0.20:0.14), PME–PME:PME–PLE (0.37:0.80); AME:ALE:PME:PLE (0.44:0.32:0.56:0.54). MOA 1.28 long, front width 0.99, back width 1.46. Measurements of legs: I 40.47 (11.12, 15.71, 8.78, 4.86), II 41.18 (11.70, 15.62,



Figures 44–49.—*Dolomedes senilis*. 44. Female, dorsal view; 45. Left chelicera, prolateral view; 46. Epigynum; 47. Vulva; 48. Left palp of the male, ventral view; 49. Left palp of the male, retrolateral view. Scale lines: 44 = 2 mm; 45 = 1 mm; 46–49 = 0.5 mm.

9.00, 4.86), III 39.47 (11.57, 14.40, 9.00, 4.50), IV (lost). Tibiae I and II with four pairs of ventral spines, tibia III with three pairs. Median field of the epigynum widest at anterior part, and narrower at posterior margin; copulatory duct and spermatheca thick.

Male.—Unknown.

Etymology.—The specific name refers to its close resemblance to *D. raptor*.

Distribution.—China (Yunnan).

Dolomedes saganus Bösenberg & Strand
1906

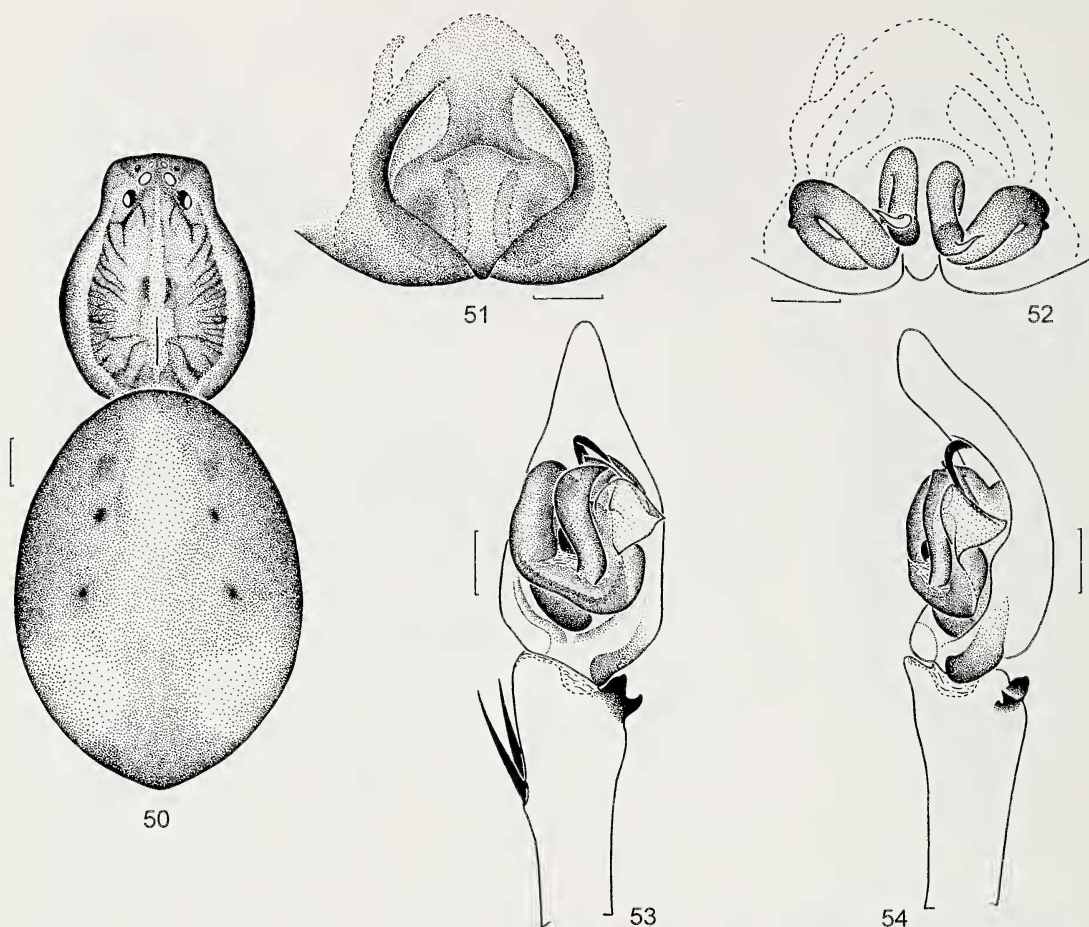
Figs. 38–43

Dolomedes saganus Bösenberg & Strand 1906: 312, pl. 8, fig. 115, pl. 13, fig. 328 (holotype female, 1 male paratype from Yamato, Japan, in Hamburg Museum, not examined); Lee 1966: 58, figs. 21c–d; Hu 1984: 258, figs. 270.3–4; Yaginuma 1986: 172, fig. 95.4; Chikuni 1989: 106, fig. 4.

Dolomedes pallitarsis Dönitz & Strand in Bösenberg & Strand 1906: 388, pl. 8, fig. 114 (holotype female from Saga, Japan, depository not mentioned by authors); Hu 1984: 257, fig. 270.1; Yaginuma 1986: 171, fig. 95.2; Song 1987: 205, figs. 163–164; Chikuni 1989: 107, fig. 7; Feng 1990: 158, figs. 133.1–4; Chen & Gao 1990: 134, figs. 167a–b; Chen & Zhang 1991: 223, figs. 230.1–4; Zhao 1993: 304, figs. 139a–c; Song et al. 1999: 347, figs. 13D, 202O–P, 203H–I. NEW SYNONYMY.

Dolomedes insurgens Chamberlin 1924: 25, pl. 6, fig. 41 (male holotype from Suzhou, Jiangsu, China, in National Museum of Natural History, Smithsonian Institution, examined by Song 1988); Yin et al. 1980: 174, figs. 94a–f; Hu 1984: 256, figs. 269.1–6; Song 1988: 132, figs. 11A–B; Chen & Gao 1990: 133, figs. 166a–b; Song et al. 1999: 347, figs. 203D–E. NEW SYNONYMY.

Material examined.—CHINA: Zhejiang: 1 ♀, Tianmu Mt., 16 July 1981, Z.F. Chen



Figures 50–54.—*Dolomedes stellatus*. 50. Female, dorsal view; 51. Epigynum; 52. Vulva; 53. Left palp of the male, ventral view; 54. Left palp of the male, retrolateral view. Scale lines: 50 = 2 mm; 51, 52 = 0.5 mm; 53, 54 = 1 mm.

(MHU); *Hubei*: 1 ♀, Yingshan, 27 June 1984 (LSHU); *Guizhou*: 1 ♀, Fanjing Mt., 28 July 2001, J.X. Zhang (MHU). JAPAN: *Kagoshima*: 1 ♀, 1 ♂, Yakushima Island, 17 July 1990, A. Tanikawa (MHU); *Tokyo*: 2 ♀, 1 ♂, Yokozawa, Itsukaichi-shi, 12 July 1992, A. Tanikawa (MHU).

Diagnosis.—This species resembles *D. senilis* in body shape and coloration, but can be distinguished from the latter by the median field of the epigynum not rhomboid in shape, its posterior margin reaching the genital groove (Figs. 39, 40); tibia of the male palp long; fulcrum small, with its top not beyond the median apophysis (Figs. 42, 43).

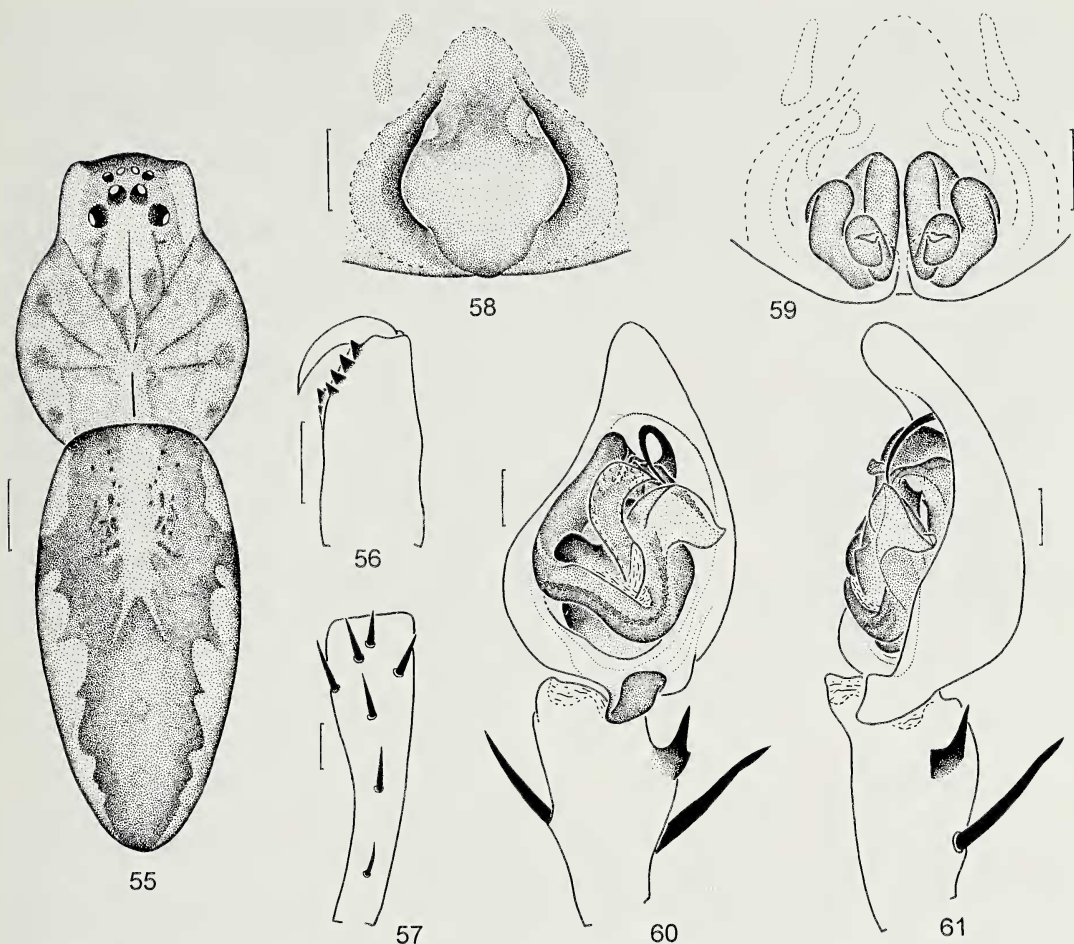
Female.—See descriptions of *Yaginuma* (1986) and Chikuni (1989). See also the descriptions of *D. pallitarsis* by Song (1987) and Zhao (1993). Median field of the epigynum

with a posterior triangular sclerotized plate, but with variation in its size; spermatheca long and coiled.

Male.—See descriptions of *Yaginuma* (1986) and Chikuni (1989). See also Song's (1987) and Zhao's (1993) descriptions of *D. pallitarsis*. The male description and illustrations in this study are based on the specimens from Japan. Tibial apophysis of palp with two branches; basal apophysis of cymbium distinct; embolus flagelliform.

Distribution.—China (Jiangsu, Zhejiang, Hubei, Hunan, Guangdong, Sichuan, Guizhou, Taiwan); Japan.

Remarks.—The species *D. insurgens* Chamberlin 1924 was redescribed by Song (1988) based on the male holotype. Judging from the illustrations of its male palpal organ (Song 1988: 132, figs. 11A–B), we found its



Figures 55–61.—*Dolomedes sulfureus*. 55. Female, dorsal view; 56. Left chelicera, retrolateral view; 57. Femur of left female palp, dorsal view; 58. Epigynum; 59. Vulva; 60. Left palp of the male, ventral view; 61. Left palp of the male, retrolateral view. Scale lines: 55, 56 = 2 mm; 57–61 = 0.5 mm.

difference from that of *D. saganus* Bösenberg & Strand 1906 was due to the slightly outward median apophysis which was forced to move by the extended basal membrane. The shape of the female copulatory organ of *D. insurgens* Chamberlin 1924 (Yin et al. 1980: 174, figs. 94a–f) is the same as that of *D. saganus*. Besides, the features of the female and male copulatory organs of *D. pallitarsis* Dönitz and Strand 1906 (Yaginuma 1986; Song 1987; Chikuni 1989) are also in accord with those of *D. saganus*. Therefore the two species are both synonymized with *D. saganus*.

Dolomedes senilis Simon 1880

Figs. 44–49

Dolomedes senilis Simon 1880: 101 (holotype female from Beijing, China, in Muséum Nationale

d'Histoire Naturelle, Paris, lost); Song & Zheng 1982: 156, figs. 3–4; Hu 1984: 258, figs. 271.1–3; Guo 1985: 132, figs. 2–69.1–3; Song 1987: 205, fig. 165; Zhang 1987: 166, figs. 140.1–2; Feng 1990: 159, figs. 134.1–4;

Dolomedes senillis: Song et al. 1999: 347, figs. 202Q, 203J; Song et al. 2001: 266, fig. 166 (lapsus for *D. senilis*).

Dolomedes strandi Bonnet 1929: 268, figs. 1–3 (female and male syntypes from Russia, depository not clear); Marusik 1988: 1471, figs. 1.6–7; Renner 1988: 2, figs. 1a, 2–5. NEW SYNONYMY.

Material examined.—CHINA: *Beijing*: 1 ♀, 2 ♂, Badaling, 1 July 1974 (IZB); 2 ♂, Yuanmingyuan, 10 May 1978 (IZB); *Hebei*: 2 ♂, Bailuquan, Shijiazhuang, 7 May 1986 (MHU); 1 ♂, Baishi Mt., Laiyuan, 19 July 1999, F. Zhang (MHU).

Diagnosis.—This species is similar to *D. saganus* in the body shape and coloration, but can be distinguished from the latter by the median field of the epigynum rhomboid, with its posterior margin not reaching the genital groove (Fig. 46); tibia of the male palp short; fulcrum large, with its top beyond the tip of median apophysis (Figs. 48, 49).

Female.—See descriptions of Song & Zheng (1982) and Song (1987). Median field of the epigynum rhomboid; spermatheca long and coiled.

Male.—See descriptions of Song & Zheng (1982) and Song (1987). Tibial apophysis of palp with two branches; basal apophysis of cymbium distinct; embolus flagelliform.

Distribution.—China (Beijing, Hebei, Shaanxi); Russia.

Remarks.—Marusik (1988) and Renner (1988) redescribed the species *D. strandi*. Judging from their descriptions and illustrations of the female and male copulatory organs, we consider it to be conspecific with *D. senilis*.

Dolomedes stellatus Kishida 1936

Figs. 50–54

Dolomedes stellatus Kishida 1936: 121, fig. 1 (holotype female from Honshu, the main island of Japan, presumably lost); Paik 1969: 39, figs. 6, 40–45; Hu 1984: 259, figs. 272.1–2; Song 1987: 207, fig. 166; Chen & Gao 1990: 134, figs. 168a–b; Chen & Zhang 1991: 223, figs. 231.1–2; Song et al. 1999: 347, figs. 203A–B; Song et al. 2001: 267, fig. 167.

Material examined.—CHINA: *Shandong*: 2 ♀, 1 ♂, Kunyu Mt., 26 July 1990, J.L. Hu (MHU).

Diagnosis.—This species is similar to *D. saganus* in the shape of the palpal organ, but it differs from the latter in: posterior part of the median field of the epigynum lacking sclerotized plate (Fig. 51); spermatheca short (Fig. 52); basal apophysis of cymbium of the male palp not hook-shaped; saddle small (Figs. 53, 54).

Female.—See descriptions of Paik (1969) and Song (1987). Median field of the epigynum with a transverse ridge; accessory bulb visible in dorsal view; spermatheca short and thick.

Male.—See descriptions of Paik (1969). Tibial apophysis of the palp branched; saddle

small; basal apophysis of cymbium not distinct.

Distribution.—China (Shanxi, Zhejiang, Shandong, Sichuan); Japan, Korea.

Dolomedes sulfureus L. Koch 1877

Figs. 55–61, 194–199

Dolomedes sulfureus L. Koch, 1877: 778 (female juvenile holotype from Japan, in the Museum at Vienna, not examined); Bösenberg & Strand 1906: 311, pl. 13, fig. 330; Paik 1969: 29, figs. 1–3, 8–9, 16, 19–33; Hu 1984: 258, fig. 270.2; Yaginuma 1986: 171, fig. 95.1; Song 1987: 208, fig. 167; Chikuni 1989: 107, fig. 6; Feng 1990: 160, figs. 135.1–5; Chen & Gao 1990: 135, figs. 169a–b; Chen & Zhang 1991: 224, figs. 232.1–2; Song et al. 1993: 874, figs. 42A, B; Zhao 1993: 306, figs. 140a, b; Song et al. 1999: 347, figs. 203C, K.

Caripeta japonica Bösenberg & Strand 1906: 307, pl. 13, fig. 343 (holotype female from Saga, Kompira, Japan, depositary not mentioned by authors). First synonymized by Paik (1969).

Dolomedes oviger Dönitz & Strand in Bösenberg & Strand 1906: 389, pl. 8, fig. 113 (data on types not mentioned by authors). First synonymized by Kishida (1936).

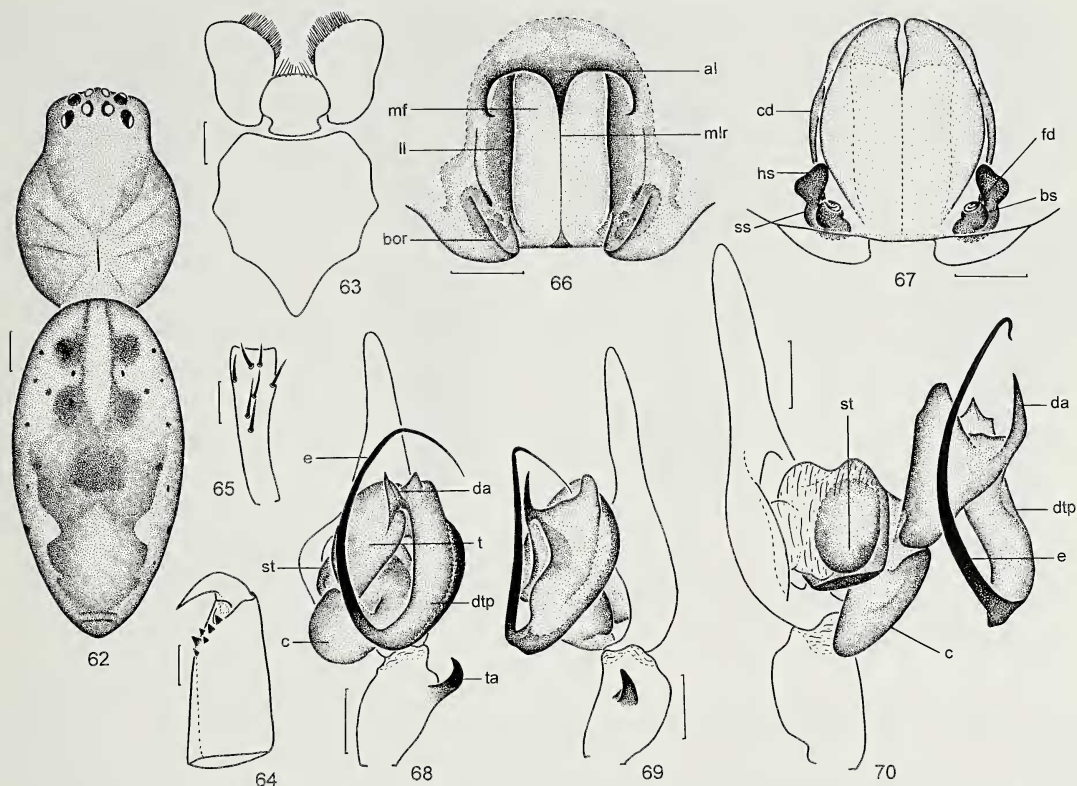
Dolomedes annulatus Kishida 1936: 121, pl. 13, fig. 7 (holotype female from Nagano Prefecture, Japan, presumably lost). First synonymized by Paik (1969).

Dolomedes angustivirgatus Kishida 1936: 123, pl. 13, fig. 3 (male holotype from Japan, presumably lost); Paik 1969: 36, figs. 5, 38–39; Hu 1984: 254, figs. 266.1–2. First synonymized by Yaginuma (1986).

Dolomedes hercules Bösenberg & Strand 1906: 310, pl. 13, fig. 361 (holotype female from Yokohama, Japan, in Stuttgart Museum, not examined); Paik 1969: 33, figs. 4, 10–12, 17, 34–37. First synonymized by Yaginuma (1986).

Dolomedes insurgens: Feng 1990: 157, figs. 132.1–6 (misidentification).

Material examined.—CHINA: *Anhui*: 1 ♀, Huang Mt., 27 October 1974 (MHU); *Sichuan*: 1 ♀, Emei Mt., 30 September 1975 (MHU); *Hubei*: 2 ♀, 2 ♂, Wuhan, 7 November 1977, J.Z. Zhao (LSHU); 1 ♀, Yingshan, 3 July 1984, (LSHU); *Guizhou*: 1 ♀, Meitan, 18 May 1981, F.J. Li (MHU); 3 ♀, 1 ♂, Maolan National Natural Reserve, Libo, 2 August 1995, H.M. Chen (MHU); 1 ♀, 1 ♂, Fanjing Mt., 4 August 2001, D.C. Zhang & Z.S. Zhang (MHU); 1 ♂, Jiangkou, 5 August 2001, J.X. Zhang (MHU); 1 ♀, Weng'ang, Libo, 9 August 2001, J.X. Zhang (MHU); *Zhejiang*: 1 ♀, Tianmu Mt., 16 July 1981, Z.F. Chen



Figures 62–70.—*Eurychoera banna*. 62. Female, dorsal view; 63. Endites, labium and sternum; 64. Left chelicera, retrolateral view; 65. Femur of left female palp, dorsal view; 66. Epigynum; 67. Vulva; 68. Left palp of the male, ventral view; 69. Left palp of the male, retrolateral view; 70. Left palp of the male, expanded. Scale lines: 62 = 1 mm; 63–65 = 0.5 mm; 66, 67 = 0.3 mm; 68–70 = 0.2 mm.

(MHU); *Fujian*: 1 ♀, Wuyi Mt., 10 June 1986, Z.F. Chen (MHU); 1 ♀, 1 ♂, Longqi Mt., Jiangle, 14 August 1991, S.Q. Li (IZB); *Yunnan*: 1 ♀, Lincang, 7 August 1999, X.Z. Gan (MHU); 1 ♂, Gong Mt., 8 July 2001, Z.Z. Yang (MHU); *Taiwan*: 1 ♀, Qilong, 26 July 2000, J.N. Huang (BTU); *Hunan*: 3 ♀, Nanhua Mt., Fenghuang, 24 July 2001, J.X. Zhang & Z.S. Zhang (MHU); 1 ♀, Zhangjiajie, Dayong, 7 August 2001, G.D. Ren (MHU).

Diagnosis.—This species is closely related to *D. chinensis* in the shape of epigynum, but can be distinguished from the latter by the posterior margin of the median field of the epigynum tongue-shaped (Fig. 58); tip of the spermatheca pointing backwards and not distinctly inflated (Fig. 59). It is also similar to *D. saganus* Bösenberg & Strand 1906 in the shape of male palpal organ, but differs from the latter in: anterior part of the median field of the epigynum slightly swollen; spermatheca thick (Fig. 59); basal apophysis of cymbium

tapered off to the base; distal end of the median apophysis inflated (Figs. 60, 61).

Female.—See descriptions of Song (1987) and Chikuni (1989). Median field of the epigynum peach-shaped, with its anterior part slightly swollen; spermatheca long and coiled.

Male.—See descriptions of Song (1987) and Chikuni (1989). Tibial apophysis of the palp branched; basal apophysis of cymbium tapered off to the base; embolus long and flagelliform.

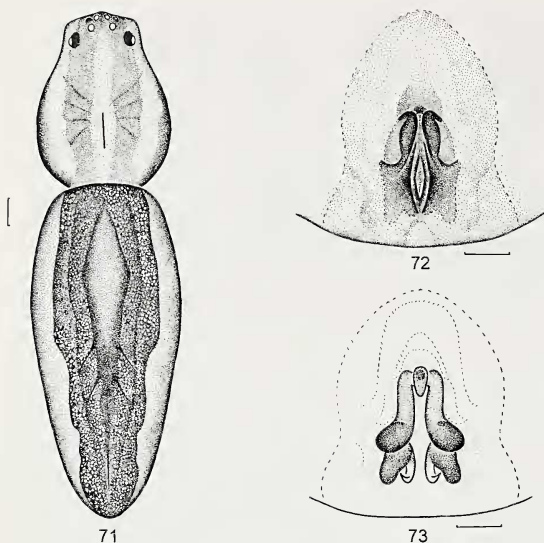
Distribution.—China (Zhejiang, Anhui, Fujian, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Taiwan); Japan, Korea, Russia.

Eurychoera Thorell 1897

Eurychoera Thorell 1897: 19.

Type species.—*Eurychoera quadrimaculata* Thorell 1897, by monotypy.

Diagnosis.—This genus can be easily distinguished from others of the family by anterior lateral spinneret with a nubbin (Fig. 202);



Figures 71–73.—*Hygropoda argentata*. 71. Female, dorsal view; 72. Epigynum; 73. Vulva. Scale lines: 71 = 1 mm; 72, 73 = 0.2 mm.

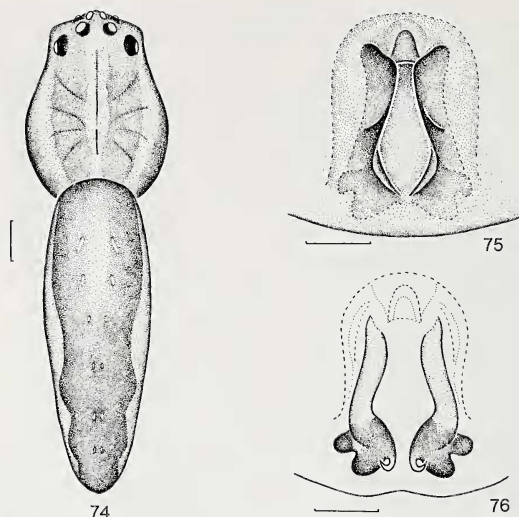
lateral lobe of the epigynum with a basal oblique rumple (Fig. 66); epigynum with an anterior lobe, which extended backwards and forming a mesal longitudinal ridge (Fig. 66); male palpal organ lacking median apophysis; distal apophysis small and triangular (Figs. 68, 69).

Remarks.—Only the type species has been reported, which is only known from Singapore. We studied specimens of *Eurychoera quadrimaculata* deposited in the Raffles Museum of Singapore, and concluded that the species found in China is new to science.

Eurychoera banna new species
Figs. 62–70, 200–205

Material examined.—Holotype female, Menglun (21°55'N, 101°15'E), Yunnan, China, 30 June 2001, C. Zhang & D.Q. Li (MHU). Paratypes: 4 females, 7 males, same data as holotype (MHU); 1 ♀, 2 ♂, Menglun (21°55'N, 101°15'E), Yunnan, China, 14 July 2001, C. Zhang & D.Q. Li (MHU).

Diagnosis.—The new species is very similar to *E. quadrimaculata* in body coloration, but can be distinguished from the latter by the lateral margins of lateral lobe of epigynum almost parallel (Fig. 66); head of spermatheca triangular (Fig. 67); palpal tibial apophysis of male not branched at the tip; and the embolus longer than that of the latter (Figs. 68–70).



Figures 74–76.—*Hygropoda campanulata*. 74. Female, dorsal view; 75. Epigynum; 76. Vulva. Scale lines: 74 = 1 mm; 75, 76 = 0.2 mm.

Female.—Total length 8.64–9.14. Holotype total length 8.64: cephalothorax 3.42 long, 2.88 wide; abdomen 5.67 long, 3.33 wide. Carapace red brown. Palp orange. Chelicerae, labium, endites and sternum red brown. Legs orange. Abdomen yellow brown, dorsum with five dark brown and two white patches. Chelicerae with three teeth on both margins. Both eye rows recurved. AME–AME:AME–ALE (0.14:0.09); PME–PME:PME–PLE (0.23:0.30); AME:ALE:PME:PLE (0.22:0.20:0.21:0.23); MOA 0.65 long, front width 0.59, back width 0.65. Measurements of legs: I 17.42 (4.95, 6.21, 4.32, 1.94), II 17.83 (5.09, 6.30, 4.50, 1.94), III 13.68 (4.14, 4.77, 3.33, 1.44), IV 15.13 (4.41, 5.18, 3.92, 1.62). Leg formula: 2, 1, 4, 3. Tibiae I and II with four pairs of ventral spines, III and IV with three pairs. Unpaired tarsal claw with two teeth. Median field of the epigynum quadrate, lateral margins of lateral lobe almost parallel; copulatory duct thin, head of spermatheca almost triangular.

Male.—Total length 4.50–5.04. A male total length 4.50: cephalothorax 2.12 long, 1.71 wide; abdomen 2.70 long, 1.26 wide. Characters as in holotype female. Measurements of palp and legs: palp 2.68 (1.09, 0.34, 0.31, 0.94); leg I 11.12 (2.97, 3.78, 2.88, 1.49), II 11.35 (3.06, 3.92, 2.88, 1.49), III 8.38 (2.43, 2.75, 2.12, 1.08), IV 9.32 (2.61, 3.06, 2.43, 1.22). Tibial apophysis of palp hook-shaped

in ventral view; embolus flagelliform, conductor flat and axe-shaped.

Etymology.—The specific name is a noun in apposition, and refers to the type locality.

Distribution.—China (Yunnan).

Hygropoda Thorell 1894

Hygropoda Thorell 1894: 4; Hu 1984: 260; Yaginuma 1986: 176.

Type species.—*Tegenaria dolomedes* Dolschall 1859, by original designation.

Diagnosis.—This genus can be easily dis-

tinguished from others of the family by: posterior lateral and median spinnerets with cylindrical gland spigots (Figs. 209, 211–213); leg I, II and IV with long and flexible tarsi; conductor and distal apophysis membranous (Figs. 83–85).

Remarks.—This genus comprises 17 species distributed in Asia (14 species), Africa (three species) and Australia (one species). Besides the two known species, *H. higenaga* and *H. taeniata* Wang 1993, another four species are considered new to science and reported here.

KEY TO CHINESE *HYGROPODA* SPECIES

- 1. Female 2
 Male; palpal tibia slightly curved; distal apophysis of palpal organ membranous, embolus needle-shaped (Figs. 83–85) *H. higenaga*
- 2. Carapace with a dark longitudinal stripe in front of fovea 3
 Carapace lacking dark longitudinal stripe in front of fovea 5
- 3. Median field of epigynum almost trapeziform; copulatory duct thin, spermatheca with only one chamber (Figs. 87, 88) *H. menglun*
 Epigynum otherwise; copulatory duct thick, spermatheca with two chambers 4
- 4. Median field of epigynum almost as long as wide, with a mesal longitudinal ridge; head of spermatheca with a small lateral tubercle (Figs. 95, 96) *H. yunnan*
 Median field of epigynum longer than wide, lacking a mesal longitudinal ridge; head of spermatheca lacking a lateral tubercle (Figs. 75, 76) *H. campanulata*
- 5. Median field of epigynum widest at anterior margin; copulatory duct short (Figs. 80, 81) *H. higenaga*
 Epigynum otherwise; copulatory duct long 6
- 6. Median field of epigynum rhomboid, margins of lateral lobe swollen at anterior half part; base of spermatheca almost oval (Figs. 72, 73) *H. argentata*
 Epigynum otherwise; base of spermatheca round *H. taeniata*

Hygropoda argentata new species
 Figs. 71–73

Material examined.—Holotype female from Menglun (21°55'N, 101°15'E), Yunnan, China, 3 July 2001, C. Zhang (MHU).

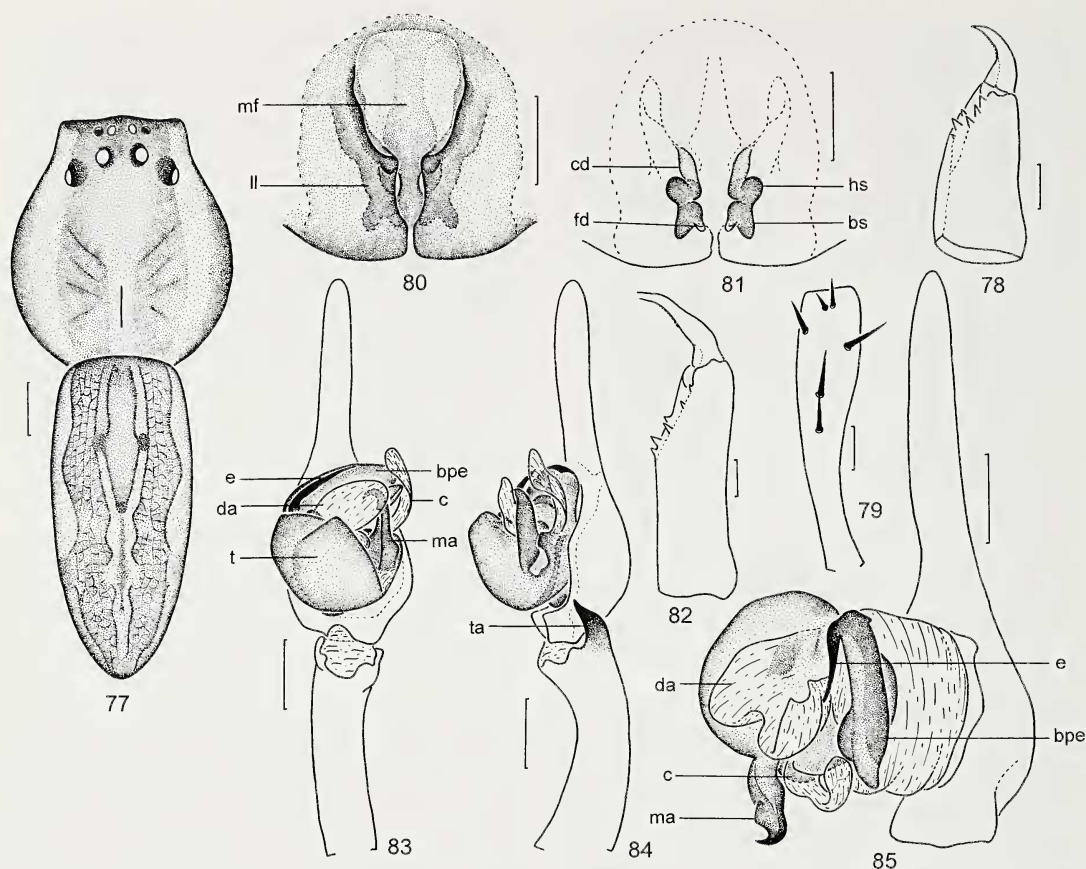
Diagnosis.—The new species is closely related to *H. campanulata*, but it differs from the latter in: dorsum of abdomen with many silvery spots (Fig. 71); median field of the epigynum narrow and rhomboid (Fig. 72); and copulatory duct short (Fig. 73).

Female.—Total length 12.70: cephalothorax 4.50 long, 3.87 wide; abdomen 9.00 long, 3.92 wide. Carapace brown, with lateral and mesal orange band. Chelicerae, endites and legs orange. Labium gray brown. Sternum yellowish, with marginal grayish patches. Dorsum of abdomen brown, with numerous

silvery spots and a rhomboid brown patch at anterior part. Chelicerae with three teeth on both margins. Anterior eye row almost straight, posterior eye row recurved. AME–AME:AME–ALE (0.16:0.07); PME–PME:PME–PLE (0.33:0.46). AME:ALE:PME:PLE (0.20:0.18:0.23:0.26). MOA 0.65 long, front width 0.59, back width 0.83. Measurements of legs: I (lost), II 34.52 (9.36, 10.49, 8.10, 6.57), III 16.08 (5.04, 5.09, 4.10, 1.85), IV 34.07 (10.08, 9.63, 8.87, 5.49). Tibiae I and II with four pairs of ventral spines, III and IV with three pairs. Margins of lateral lobes of epigynum swollen at the anterior part, median field narrow and rhomboid; copulatory duct short, spermatheca with head and base.

Male.—Unknown.

Etymology.—The specific name is from



Figures 77–85.—*Hygropoda higenaga*. 77. Female, dorsal view; 78. Left chelicera of female, retrolateral view; 79. Femur of left female palp, dorsal view; 80. Epigynum; 81. Vulva; 82. Left chelicera of male, retrolateral view; 83. Left palp of the male, ventral view; 84. Left palp of the male, retrolateral view; 85. Left palp of the male, expanded. Scale lines: 77 = 1 mm; 78–85 = 0.5 mm.

the Latin *argentata*, and refers to the dorsum of abdomen with numerous silvery spots.

Distribution.—China (Yunnan).

Hygropoda campanulata new species

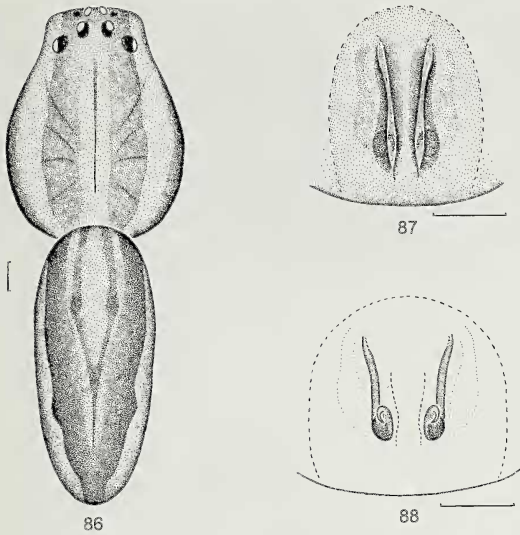
Figs. 74–76

Material examined.—Holotype female from Menglun (21°55'N, 101°15'E), Yunnan, China, 30 June 2001, D.Q. Li (MHU); 1 female paratype from Menglun, Yunnan, China, 3 July 2001, C. Zhang (MHU).

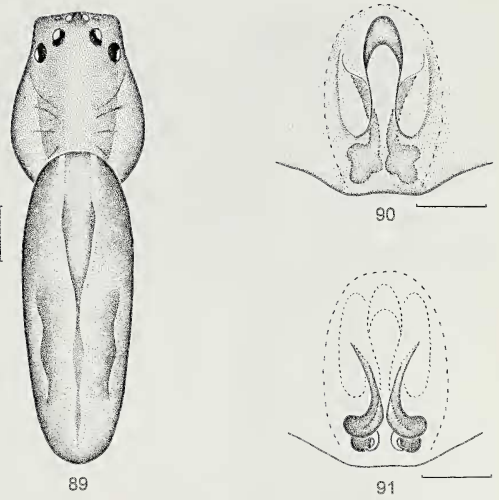
Diagnosis.—The new species is similar to *H. argentata*, but it differs from the latter by dorsum of abdomen with pairs of small spots (Fig. 74); median field of epigynum wide and not rhomboid, with a bell-shaped hood at anterior part (Fig. 75); and copulatory duct long (Fig. 76).

Female.—Total length 7.11–8.82. Holotype total length 8.82: cephalothorax 3.33 long,

2.52 wide; abdomen 5.58 long, 2.03 wide. Carapace yellow brown, with lateral and mesal yellow bands. Chelicerae yellow. Endites, labium and legs yellow brown. Sternum yellowish, with marginal grayish patches. Dorsum of abdomen dark brown, with a rhomboid yellow brown patch at anterior part and pairs of small spots. Chelicerae with three teeth on both margins. Anterior eye row almost straight, posterior eye row recurved. AME–AME:AME–ALE (0.08:0.05); PME–PME:PME–PLE (0.33:0.36). AME:ALE:PME:PLE (0.17:0.13:0.23:0.23). MOA 0.56 long, front width 0.40, back width 0.75. Measurements of legs: I 25.75 (6.21, 7.97, 6.44, 5.13), II 19.72 (5.22, 6.17, 4.82, 3.51), III 10.54 (3.24, 3.06, 2.66, 1.58), IV 19.86 (5.72, 5.49, 5.27, 3.38). Leg formula: 1, 4, 2, 3. Tibiae I and II with 4 pairs of ventral spines, III and IV with 3 pairs. Median field of epigynum with a



Figures 86–88.—*Hygropoda menglun*. 86. Female, dorsal view; 87. Epigynum; 88. Vulva. Scale lines: 86 = 1 mm; 87, 88 = 0.1 mm.



Figures 89–91.—*Hygropoda taeniata*. 89. Female, dorsal view; 90. Epigynum; 91. Vulva. Scale lines: 89 = 1 mm; 90, 91 = 0.2 mm.

shaped hood; copulatory duct thick, head of spermatheca round.

Male.—Unknown.

Etymology.—The specific name is from the Latin *campanulata*, refers to the epigynum with a bell-shaped hood.

Distribution.—China (Yunnan).

Hygropoda higenaga (Kishida 1936)

Figs. 77–85, 206–213

Dolomedes higenaga Kishida 1936: 119, pl. 13, fig. 8 (male holotype from Okinawajima Island, Japan, presumably lost).

Hygropoda higenaga: Yaginuma 1965: 32, figs. 2.1–7; Yaginuma 1986: 176, fig. 97.2; Hu 1984: 260, figs. 273.1–2; Zhang & Zhang 2003: 15, figs. 1A–G.

Hygropoda hippocrepiforma Wang 1993: 156, figs. 1–4 (holotype female, allotype male from Mengla, Yunnan, China, in MHU, examined); Song et al. 1999: 348, figs. 203O–Q. First synonymized by Zhang & Zhang (2003).

Material examined.—Holotype female, allotype male of *H. hippocrepiforma*, Menglun, Yunnan, China, 8 July 1981, J.F. Wang (MHU). CHINA: *Guangxi*: 1 ♂, Longsheng, 10 September 1981, J.F. Wang (MHU); *Hunan*: 1 ♀, Suining, 7 March 1984, J.F. Wang (MHU); *Taiwan*: 1 ♀, Taipei, 24 July 1997, I.M. Tso (BTU); 1 ♀, Nantou, 24 August 1999, Q.C. Lai (BTU). JAPAN: *Okinawa*: 1

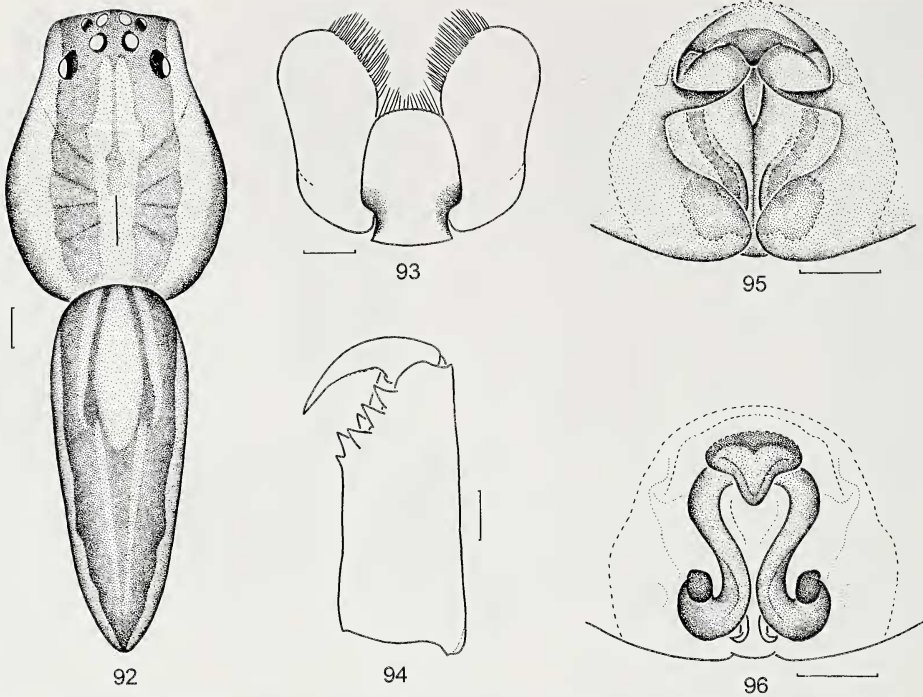
♂, Shirahama, Iriomotejima Island, 25 August 1988, A. Tanikawa (MHU); 1 ♀, Komi, Iriomotejima Island, 29 July 1995, A. Tanikawa (MHU); 1 ♀, Urauchi, Iriomotejima Island, 28 July 1996, A. Tanikawa (MHU); 1 ♂, Midara, Iriomotejima Island, 5 August 1997, A. Tanikawa (MHU).

Diagnosis.—The species is similar to *H. menglun* in body shape and coloration, but it differs from the latter in: posterior part of the median field of epigynum distinctly narrower than anterior part, intromittent orifice near the center of the lateral margin of the median field (Fig. 80); copulatory duct short and thick; spermatheca with two chambers (Fig. 81).

Female.—See descriptions of Zhang & Zhang (2003). See also the description of *H. hippocrepiforma* by Wang (1993). Posterior part of the median field of epigynum distinctly narrower than anterior part; copulatory duct short, and spermatheca with two chambers.

Male.—See descriptions of Yaginuma (1986), Hu (1984) and Zhang & Zhang (2003). Patella of the palp longer than tibia; tibia slightly curved, with a lateral apophysis not branched; distal apophysis membranous and petal-shaped; tip of the median apophysis hooked, its center with a process.

Distribution.—China (Hunan, Guangxi, Yunnan, Taiwan); Japan.



Figures 92–96.—*Hygropoda yunnan*. 92. Female, dorsal view; 93. Endites and labium; 94. Left chelicera of female, retrolateral view; 95. Epigynum; 96. Vulva. Scale lines: 92 = 1 mm; 93, 94 = 0.5 mm; 95, 96 = 0.3 mm.

Hygropoda menglun new species

Figs. 86–88

Material examined.—Holotype female, 1 female paratype from Menglun (21°55'N, 101°15'E), Yunnan, China, 6 July 2001, C. Zhang (MHU).

Diagnosis.—The new species resembles *H. higenaga* in body shape and coloration, but it differs from the latter in: median field of the epigynum almost trapeziform (Fig. 87); copulatory duct thin and long, spermatheca with only one chamber (Fig. 88).

Female.—Total length 7.88–11.52. Holotype total length 11.52: cephalothorax 5.40 long, 4.41 wide; abdomen 6.57 long, 2.79 wide. Carapace yellow brown, with lateral and mesal yellow band. Chelicerae, endites and legs yellow. Labium orange. Sternum yellowish. Dorsum of abdomen brown, with both sides dull yellow, and an almost rhomboid dull yellow patch at anterior part. Chelicerae with three teeth on both margins. Anterior eye row almost straight, posterior eye row recurved. AME–AME:AME–ALE (0.14:0.10); PME–PME:PME–PLE (0.36:0.49). AME:

ALE:PME:PLE (0.23:0.17:0.26:0.27). MOA 0.60 long, front width 0.60, back width 0.90. Measurements of legs: I 45.64 (10.53, 12.83, 10.85, 11.43), II 32.24 (8.37, 10.50, 7.02, 6.35), III 15.18 (4.82, 5.00, 3.78, 1.58), IV 31.73 (9.18, 9.09, 7.97, 5.49). Leg formula: 1, 2, 4, 3. Tibiae I and II with four pairs of ventral spines, III and IV with three pairs. Epigynum small, median field trapezoid; copulatory duct thin, spermatheca with only one chamber.

Male.—Unknown.

Etymology.—The specific name refers to the type locality, and is a noun in apposition.

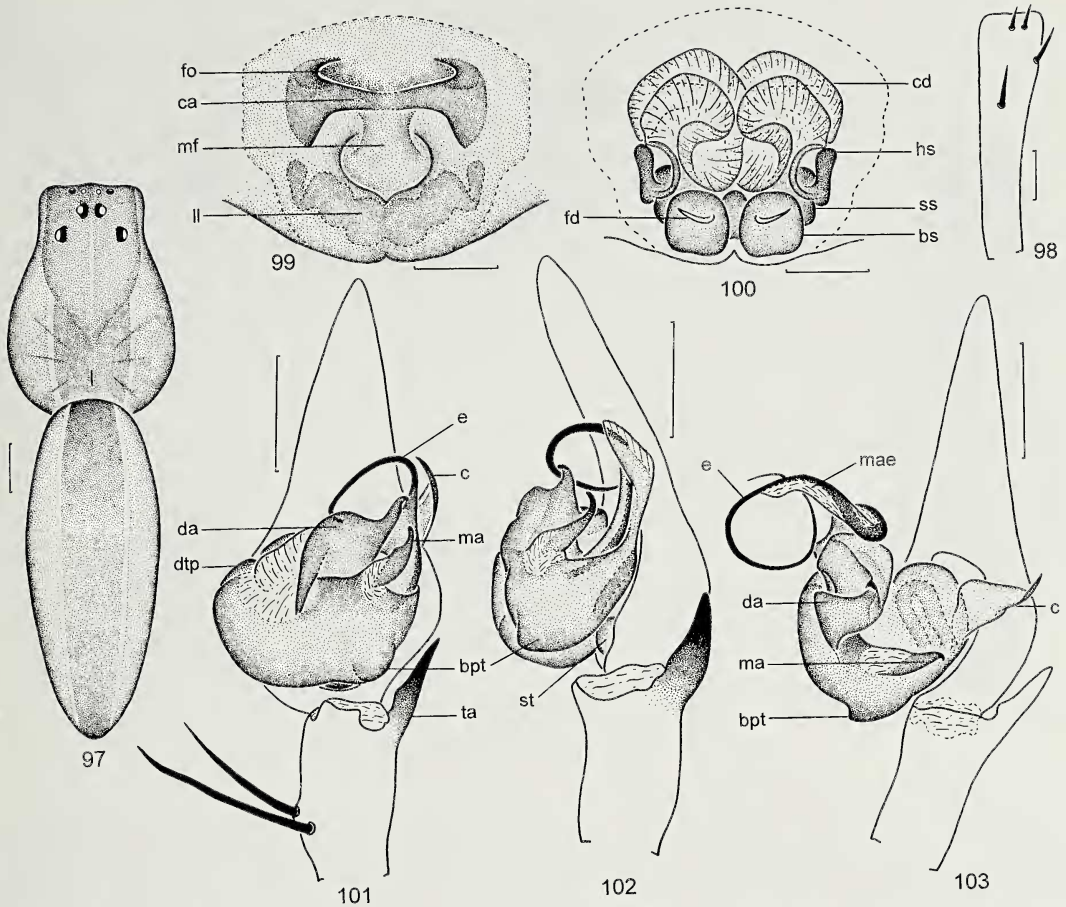
Distribution.—China (Yunnan).

Hygropoda taeniata Wang 1993

Figs. 89–91

Hygropoda taeniata Wang 1993: 157, fig. 5 (holotype female from Menglun, Yunnan, China, in MHU, examined); Song et al. 1999: 348, fig. 203L.

Material examined.—Holotype female, Menglun, Yunnan, China, 27 July 1983, K. M. Zou (MHU).



Figures 97–103.—*Perenethis fascigera*. 97. Female, dorsal view; 98. Femur of left female palp, dorsal view; 99. Epigynum; 100. Vulva; 101. Left palp of the male, ventral view; 102. Left palp of the male, retrolateral view; 103. Left palp of the male, expanded. Scale lines: 97 = 1 mm; 98, 101–103 = 0.5 mm; 99, 100 = 0.3 mm.

Diagnosis.—This species is similar to *H. higenaga* in abdominal coloration, but can be easily distinguished from the latter by the shape of the epigynum (Fig. 90).

Female.—See description of Wang (1993). Chelicera with three teeth on promargin. Lateral margins of the median field of the epigynum ripple-like, and the spermatheca with two chambers.

Male.—Unknown.

Distribution.—China (Yunnan).

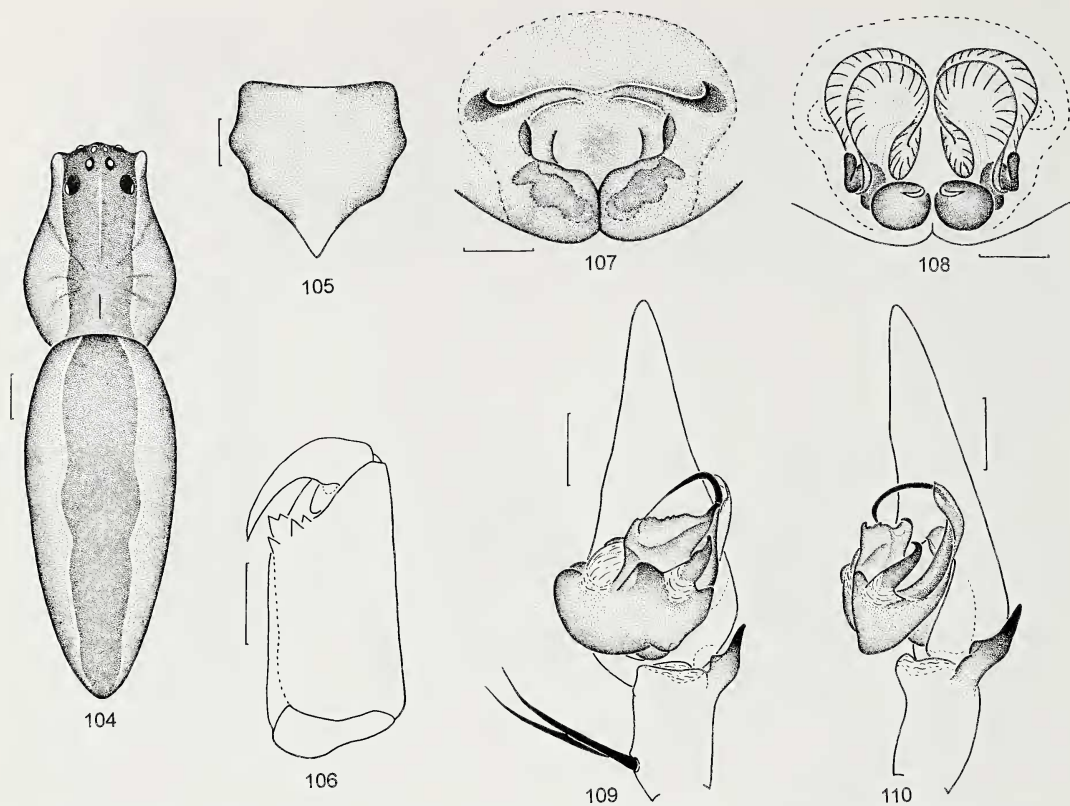
Hygropoda yunnan new species
Figs. 92–96

Material examined.—Holotype female from Mohan, Mengla (21°24'N, 101°30'E), Yunnan, China, 25 July 2000, M.S. Zhu

(MHU); 3 female paratypes from Zhenkang (23°54'N, 99°00'E), Yunnan, China, 14 September 2000, FX. Liu (MHU).

Diagnosis.—The new species is similar to *H. campanulata* in body shape and coloration, but it differs from the latter in: dorsum of the abdomen lacking paired small spots (Fig. 92); median field of the epigynum almost as long as wide, with a longitudinal ridge, anterior lobe triangular (Fig. 95); head of spermatheca with a lateral tubercle (Fig. 96).

Female.—Total length 7.92–11.30. Holotype total length 10.80: cephalothorax 4.95 long, 3.69 wide; abdomen 6.30 long, 2.34 wide. Carapace yellow brown, with lateral and mesal yellow bands. Chelicerae, endites and labium yellow brown. Sternum and legs yellow



Figures 104–110.—*Perenethis sindica*. 104. Female, dorsal view; 105. Sternum; 106. Left chelicera, retrolateral view; 107. Epigynum; 108. Vulva; 109. Left palp of the male, ventral view; 110. Left palp of the male, retrolateral view. Scale lines: 104 = 1 mm; 105, 106, 109, 110 = 0.5 mm; 107, 108 = 0.2 mm.

lowish. Dorsum of abdomen dark brown, with an almost rhomboid brownish patch at anterior part. Chelicerae with three teeth on both margins. Anterior eye row almost straight, posterior eye row recurved. AME–AME: AME–ALE (0.13:0.09); PME–PME:PME–PLE (0.36:0.47). AME:ALE:PME:PLE (0.26:0.18:0.29:0.29). MOA 0.72 long, front width 0.57, back width 0.82. Measurements of legs: I 37.59 (8.87, 11.03, 8.69, 9.00), II 27.15 (7.34, 8.24, 6.03, 5.54), III 13.73 (4.50, 4.46, 3.33, 1.44), IV 27.46 (8.15, 7.65, 7.02, 4.64). Leg formula: 1, 4, 2, 3. Tibiae I and II with four pairs of ventral spines, III and IV with three pairs. Median field of the epigynum with a longitudinal ridge, anterior lobe triangular; head of spermatheca with a lateral tubercle.

Etymology.—The specific name refers to the type locality, and is a noun in apposition.

Distribution.—China (Yunnan).

Perenethis L. Koch 1878

Perenethis L. Koch 1878: 980; Hu 1984: 260; Chen & Zhang 1991: 225; Barrion & Litsinger 1995: 345; Sierwald 1997: 387.

Type species.—*Perenethis venusta* L. Koch 1878, by original designation.

Diagnosis.—This genus is similar to *Polyboea*, but can be distinguished from the latter by ALE smaller than PME; tibia of leg with a pair of short ventral spines at the distal end; carina of the epigynum forming two lateral branches (Fig. 99); conductor of the male palpal organ small and not provided with two guiding lamellae (Figs. 101–103).

Remarks.—This genus has recorded seven species distributed in Asia (five species), Africa (two species) and Australia (one species). Only one species, *P. fascigera*, has been reported from China. Two species of the genus are reported below, of which *P. sindica* (Simon 1897) is newly recorded from our fauna.

KEY TO CHINESE *PERENETHIS* SPECIES

1. Female 2
 Male 3
2. Carina of epigynum long, surpassing the outer margin of the head of spermatheca (Fig. 107); base of spermatheca oval (Fig. 108) *P. sindica*
 Carina of epigynum short, not surpassing the outer margin of the head of spermatheca (Fig. 99); base of spermatheca almost round (Fig. 100) *P. fascigera*
3. Anterior margin of distal apophysis smooth, conductor with several parallel longitudinal ridges (Fig. 101) *P. fascigera*
 Anterior margin of distal apophysis serrated, conductor lacking longitudinal ridges (Fig. 109) *P. sindica*

Perenethis fascigera (Bösenberg & Strand 1906)

Figs. 97–103, 214–219

Tetragonophthalma fascigera Bösenberg & Strand 1906: 306, pl. 13, fig. 329 (holotype female from Japan, in Naturkunde-Museum Stuttgart, lost).

Perenethis fascigera: Paik 1978: 375, figs. 170.1–4; Yin et al. 1980: 177, figs. 96a–c; Hu 1984: 260, figs. 274.1–3; Song 1987: 209, fig. 168; Chikuni 1989: 106, fig. 3; Chen & Gao 1990: 136, figs. 170a–b; Chen & Zhang 1991: 225, figs. 233.1–2; Song et al. 1999: 348, figs. 203M–N.

Material examined.—CHINA: *Guangxi*: 1 ♀, 2 ♂, Nanning, 18 July 1982, Y. G. Huang (GU); 1 ♀, Liangfengjiang Natural Reserve, Nanning, 7 August 2000, Z. Li (MHU); *Hainan*: 2 ♀, 1 ♂, Jianfengling, 12 December 1989, M. S. Zhu (MHU); *Yunnan*: 1 ♀, Longling, Baoshan, 2 August 1999, M. K. Yang (MHU); *Guizhou*: 1 ♀, Jiangkou, 5 August 2001, J. X. Zhang (MHU).

Diagnosis.—This species is so closely related to *P. venusta* that Sierwald (1997: 390) thought it might be conspecific with the latter. By examining the Chinese specimens of this species and comparing with the description and illustrations of *P. venusta* given by Sierwald (1997: 396, figs. 42–47, 53, 57, 75, 76), we believe that this is a distinct species, which can be distinguished from *P. venusta* by: carina of the epigynum short and not beyond the outer margin of the head of spermatheca (Fig. 99); distal end of conductor of male palpal organ sharp; and distal end of the distal apophysis not pointed backwards (Figs. 101–103).

Female.—See descriptions of Paik (1978), Hu (1984) and Song (1987). Median field of the epigynum almost heart-shaped, copulatory

duct membranous and saccate, base of spermatheca almost round.

Male.—See descriptions of Paik (1978), Chikuni (1989) and Chen & Gao (1990). Tibial apophysis of the palp finger-shaped; embolus long and slender; conductor with several parallel longitudinal ridges at the outer surface.

Distribution.—China (Zhejiang, Hunan, Guangxi, Hainan, Sichuan, Guizhou, Yunnan); Japan, Korea.

Perenethis sindica (Simon 1897)

Figs. 104–110

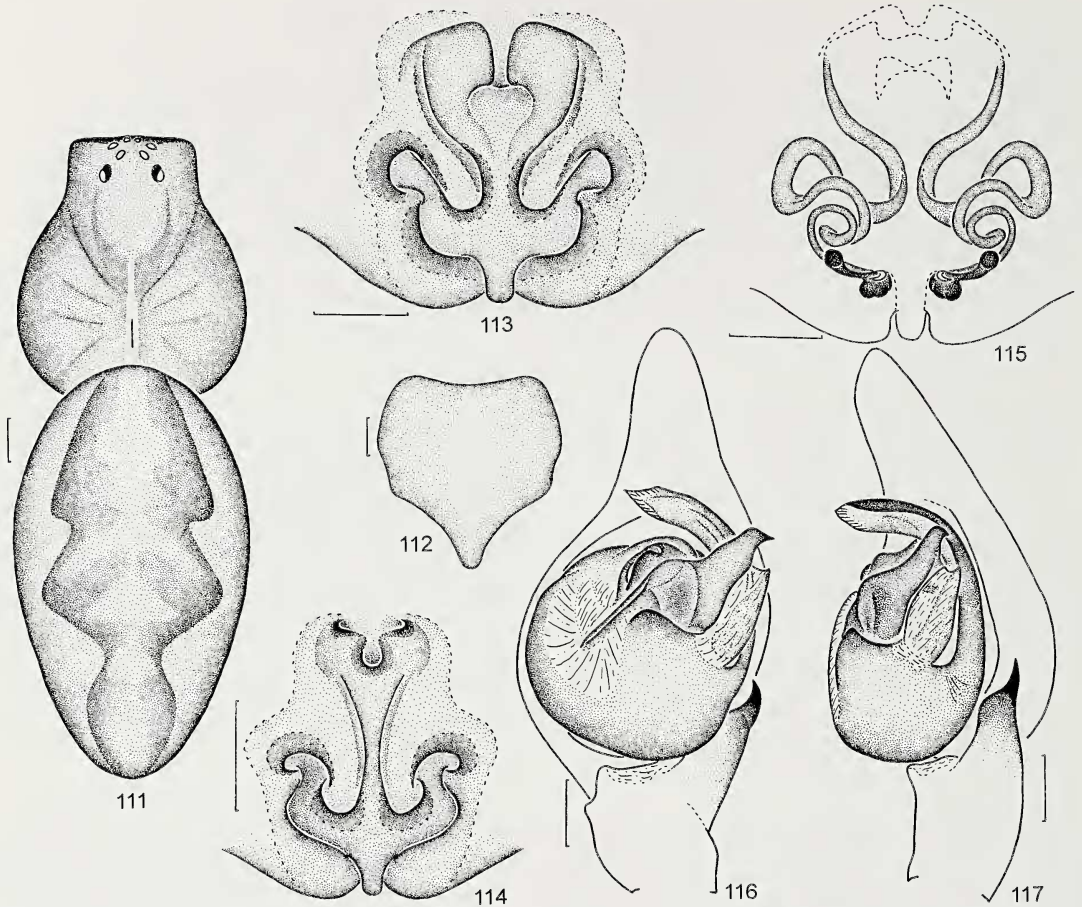
Tetragonophthalma sindica Simon, 1897: 295 (2 female syntypes from Kurrachee, India, in Muséum Nationale d'Histoire Naturelle, Paris, examined by Sierwald 1997).

Perenethis sindica: Sierwald 1997: 395, figs. 36–41, 59–72.

Material examined.—CHINA: *Yunnan*: 1 ♀, Renhe, Yongsheng, 26 July 1999, K.L. Yu (MHU); 1 ♂, Binchuan, 25 July 2002, L.Y. Liu (MHU); *Sichuan*: 1 ♀, Maomao Mt., Huili, 9 August 1999, G.D. Ren (MHU); 2 ♀, Xichang, 18 July 2000, J.X. Zhang (MHU).

Diagnosis.—This species resembles *P. fascigera* in body shape and coloration, but it differs from the latter in: longitudinal patch on the sternum light in color, and not branched laterally (Fig. 105); carina of the epigynum long and surpassing the outer margin of the head of spermatheca, basal part of spermatheca elliptic in shape (Figs. 107, 108); and anterior margin of the distal apophysis serrated (Fig. 109).

Female.—Described by Sierwald (1997). Carina of the epigynum long and surpassing the outer margin of the head of spermatheca, head of spermatheca club-shaped.



Figures 111–117.—*Pisaura ancora*. 111. Female, dorsal view; 112. Sternum; 113. Epigynum; 114. Epigynum, different individual; 115. Vulva; 116. Left palp of the male, ventral view; 117. Left palp of the male, retrolateral view. Scale lines: 111 = 1 mm; 112–117 = 0.5 mm.

Male.—Described by Sierwald (1997). Tibial apophysis of the palp finger-shaped; embolus long and slender; anterior margin of the distal apophysis serrated. Judging from the illustrations and descriptions by Sierwald (1997), features of the male palpal organ are surprisingly variable (figs. 59–72 in Sierwald 1997).

Distribution.—China (Sichuan, Yunnan); India, Sri Lanka, Nepal, Philippines.

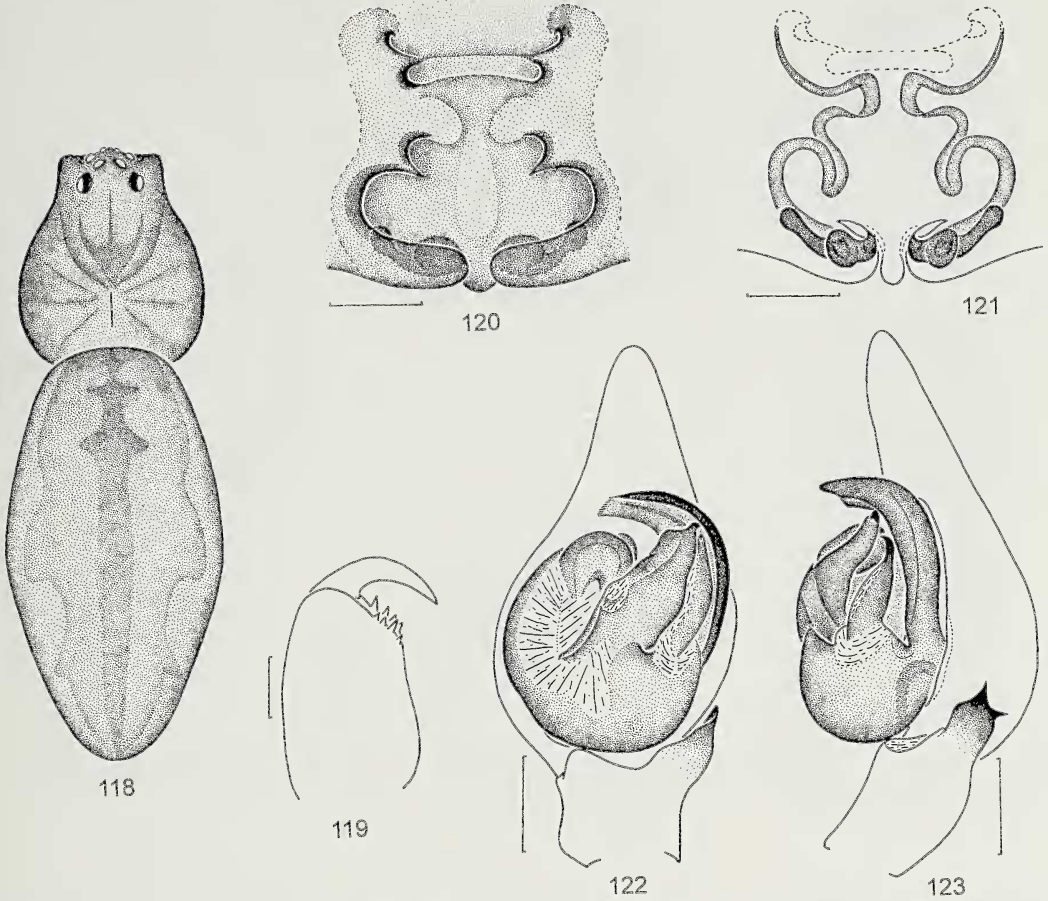
Pisaura Simon 1885

Pisaura Simon 1885b: 345; Chen & Zhang 1991: 226; Barrion & Litsinger 1995: 343; Song et al. 2001: 268; Hu 2001: 217.

Type species.—*Araneus mirabilis* Clerck 1757, by original designation.

Diagnosis.—This genus can be distinguished from the similar genera *Perenethis* and *Polyboea* by: the chelicera with three or four retromarginal teeth; lateral lobes of epigynum forming curves (Figs. 113, 120); copulatory ducts long and slender, not membranous or saccate (Figs. 115, 121); and the basal protuberance of tegulum of the male palpal organ absent (Fig. 140). It also differs from *Dianpisaura* in the epigynum lacking large depressions anteriorly (Fig. 136), copulatory duct long and coiled (Fig. 115); tibia of male palp shorter than cymbium, subtegulum invisible in ventral view, base of embolus accompanied by membrane (Figs. 138–140).

Remarks.—Up to now, 21 species of the genus have been reported worldwide (Platnick 2002; Zhang & Zhang 2003), distributed in



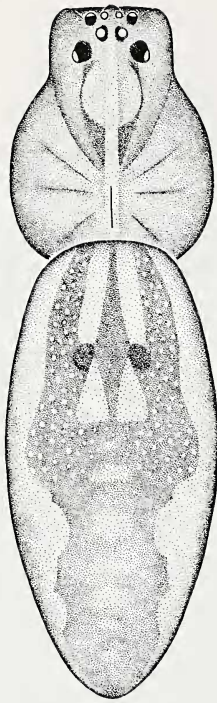
Figures 118–123.—*Pisaura bicornis*. 118. Female, dorsal view; 119. Left chelicera, prolateral view; 120. Epigynum; 121. Vulva; 122. Left palp of the male, ventral view; 123. Left palp of the male, retro-lateral view. Scale lines: 118 = 1 mm; 119, 122, 123 = 0.5 mm; 120, 121 = 0.3 mm.

Asia (17 species), Europe (three species) and Latin America (one species). Among them, *P. lizhii* Zhang 2000 and *P. songi* Zhang 2000 are transferred to the new genus *Dianpisaura* in this study. Therefore, six species of this ge-

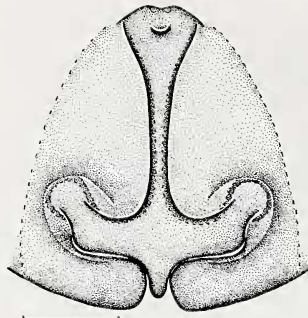
nus are reported from China, of which *P. kishidai* Saito 1936 (CHINA: Hebei) has been considered as a nomen dubium by Song et al. (2001). The other five species are reported here.

KEY TO CHINESE *PISAURA* SPECIES

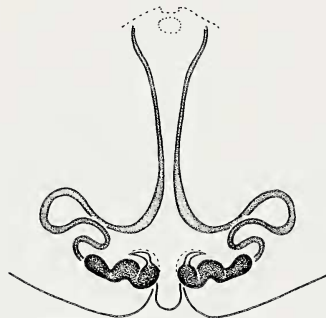
- 1. Female 2
- Male 6
- 2. Chelicera with four teeth on both margins (Fig. 119); tibiae of the first and second legs both with five pairs of ventral spines; median field of epigynum lantern-shaped (Fig. 120) *P. bicornis*
- Chelicera with three teeth on both margins; tibiae of the first and second legs both with four pairs of ventral spines; epigynum otherwise 3
- 3. Median field of epigynum almost “L”-shaped (Fig. 136); copulatory duct short, with only two curves (Fig. 137) *P. sublama*



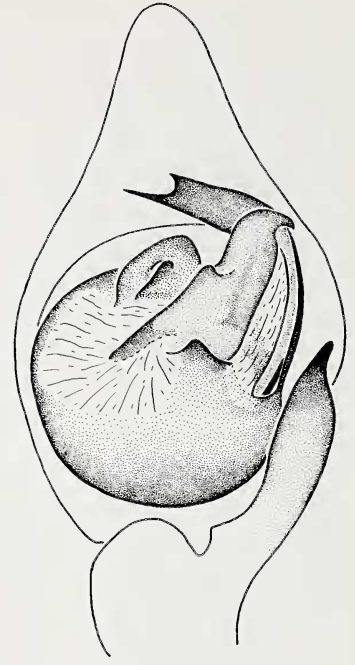
124



125



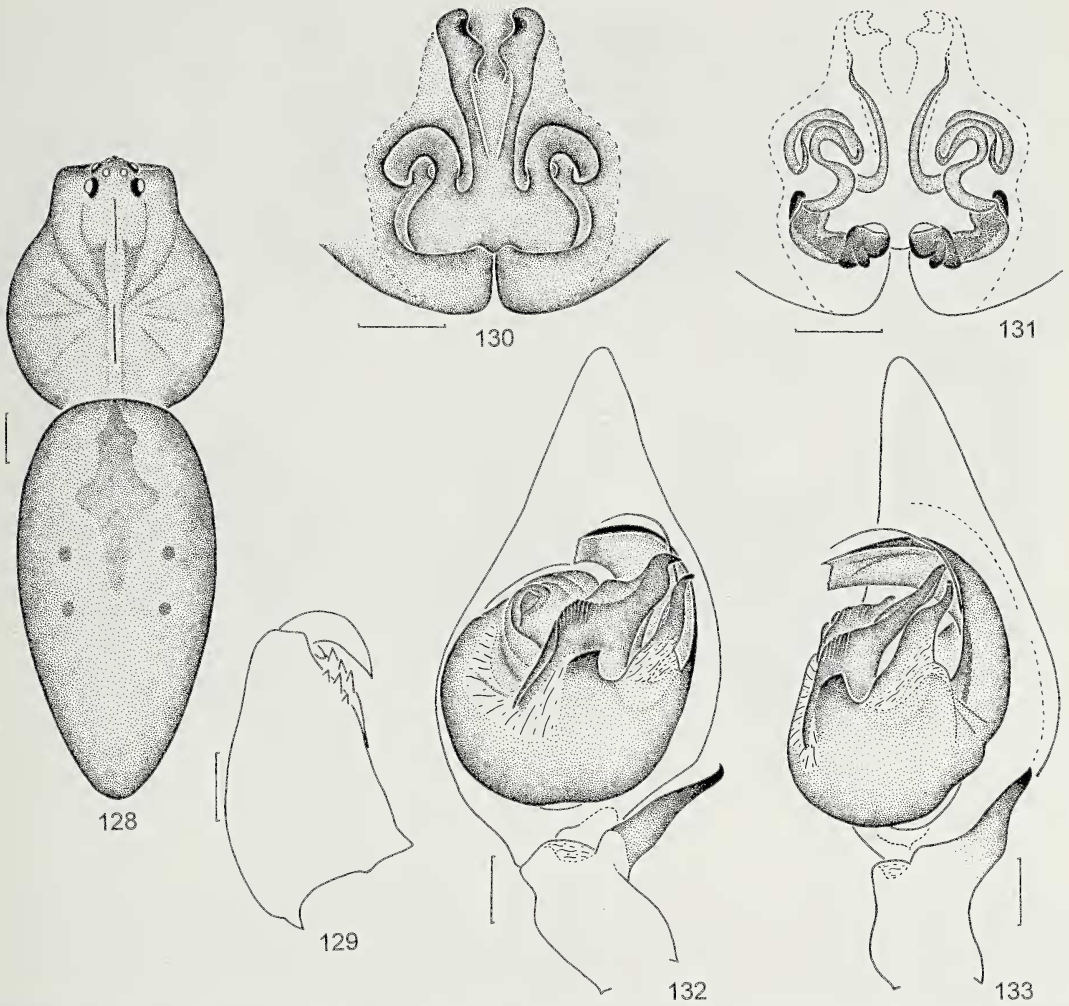
126



127

Figures 124–127.—*Pisaura lama*. 124. Female, dorsal view; 125. Epigynum; 126. Vulva; 127. Left palp of the male, ventral view (copied from Yaginuma, 1986). Scale lines: 124 = 1 mm; 125, 126 = 0.5 mm.

- Median field of epigynum otherwise; copulatory duct long, with more than three curves 4
4. Posterior margin of median field of epigynum far from genital groove (Fig. 130); copulatory duct with six curves and joined with the base of spermatheca at dorsal side (Fig. 131) ... *P. mirabilis*
- Posterior margin of median field of epigynum near genital groove; copulatory duct with four curves and joined with the base of spermatheca at ventral side 5
5. Copulatory duct thin, base of spermatheca almost as large as head (Fig. 126) *P. lama*
- Copulatory duct thick, base of spermatheca much larger than head (Fig. 115) *P. ancora*
6. Chelicera with four teeth on both margins; tibial apophysis of palp with two branches (Fig. 123) *P. bicornis*
- Chelicera with three teeth on both margins; tibial apophysis of palp not branched 7
7. Tip of palpal tibial apophysis not reaching or only slightly surpassing the base of median apophysis 8
- Tip of palpal tibial apophysis reaching half of median apophysis 9
8. Tip of palpal tibial apophysis hooked and not reaching the base of median apophysis; distal apophysis lacking central depression (Fig. 132) *P. mirabilis*
- Tip of palpal tibial apophysis not hooked and slightly surpassing the base of median apophysis; distal apophysis with a large central depression (Figs. 116, 117) *P. ancora*
9. Tip of palpal tibial apophysis spinous; apical division of distal apophysis inflated and round (Fig. 138) *P. sublama*
- Tip of palpal tibial apophysis finger-shaped; distal apophysis otherwise (Fig. 127) ... *P. lama*



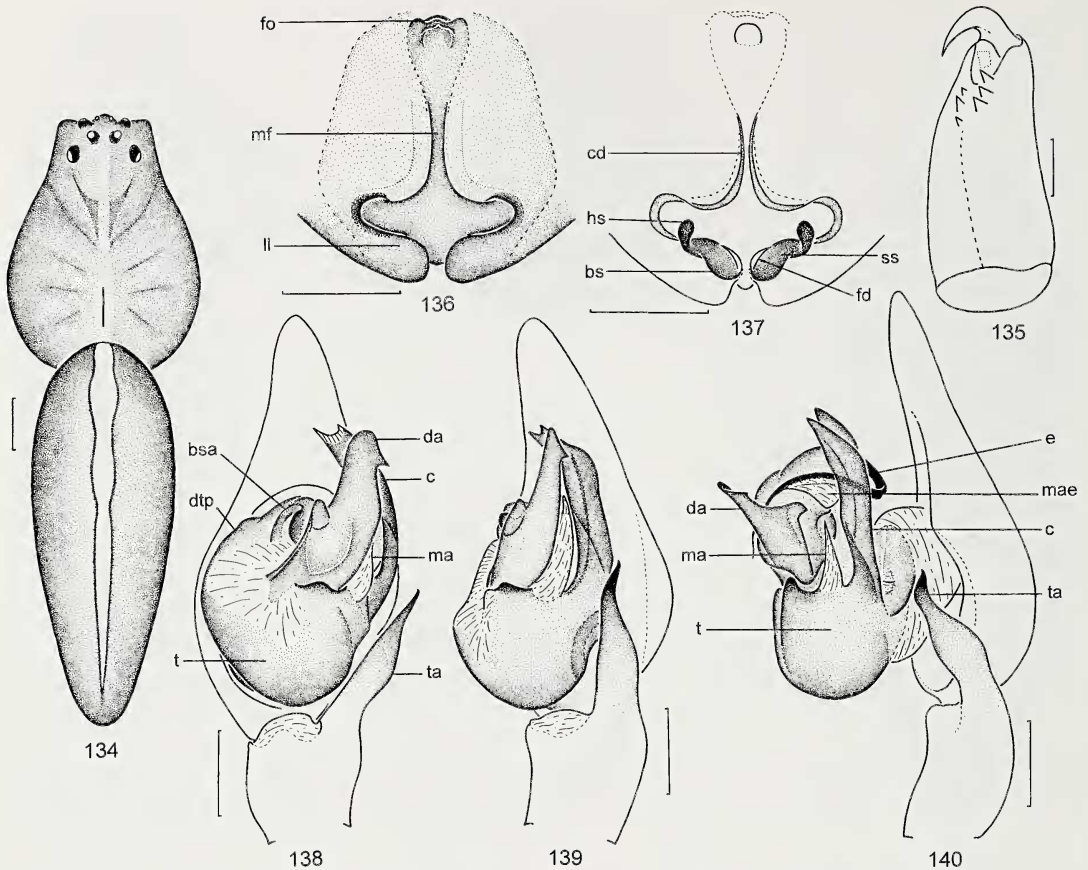
Figures 128–133.—*Pisaura mirabilis*. 128. Female, dorsal view; 129. Left chelicera, prolatateral view; 130. Epigynum; 131. Vulva; 132. Left palp of the male, ventral view; 133. Left palp of the male, retro-lateral view. Scale lines: 128 = 1 mm; 129–133 = 0.5 mm.

Pisaura ancora Paik 1969

Figs. 111–117, 220–225

Pisaura ancora Paik 1969: 49, figs. 14, 18, 54–64, text-f. 2 (holotype female, female and male paratypes from Korea, in Kyungpook National University, Korea, not examined); Paik 1978: 377, figs. 171.1–10; Song & Zheng 1982: 155, fig. 1; Zhu & Shi 1983: 147, figs. 130a–c; Hu 1984: 261, figs. 275.1–2, 276.1–2 (only ♀, not ♂); Guo 1985: 134, figs. 2–70.1–3; Song 1987: 210, fig. 169; Zhang 1987: 167, figs. 141.1–2; Logunov 1990: 37, figs. 2, 3; Feng 1990: 162, figs. 137.1–3; Chen & Gao 1990: 137, figs. 171a, b; Chen & Zhang 1991: 227, figs. 235.1–2; Song et al. 1999: 348, fig. 204A; Zhang 2000: 2, figs. 1A–E; Hu 2001: 217, figs. 115.1–4 (only ♀, not ♂); Song et al. 2001: 268, fig. 168.

Material examined.—CHINA: *Jilin*: 4 ♀, 2 ♂, Liang Mt., Liuhe, 31 May 1973 (MHU); *Zhejiang*: 1 ♀, Sanmen, 17 May 1978, (MHU); *Shanxi*: 1 ♀, Yuncheng, 16 May 1980, M.S. Zhu (MHU); 2 ♀, Guandi Mt., 4 August 1982, M.S. Zhu (MHU); *Hubei*: 1 ♀, Luoja Mt., Wuhan, 4 July 1980, (LSHU); 1 ♀, Muyuping, Shennongjia, 26 September 2001, M.S. Zhu (MHU); *Shaanxi*: 1 ♂, Taibai Mt., 15 May 1991, M.S. Zhu (MHU); 1 ♂, Feng County, 8 April 1992, M.S. Zhu (MHU); *Beijing*: 3 ♀, (no further details), 25 May 1993 (IZB); *Inner Mongolia*: 2 ♀, Huolin River, Jirem Meng, 30 June 1997, J. Tian (BIMN); *Hebei*: 1 ♂, Wuyuezhai, Shijiazhuang, 21 June 1998, W.L. Lie (MHU); 7 ♀,



Figures 134–140.—*Pisaura sublama*. 134. Female, dorsal view; 135. Left chelicera, prolateral view; 136. Epigynum; 137. Vulva; 138. Left palp of the male, ventral view; 139. Left palp of the male, retrolateral view; 140. Left palp of the male, expanded. Scale lines: 134 = 1 mm; 135–140 = 0.5 mm.

Taihang Mts., June to August 1999, F. Zhang (MHU); *Guizhou*: 2 ♀, Xianheping Natural Reserve, Anlong, 8 June 1999, H.M. Chen (MHU).

Diagnosis.—This species is similar to *P. mirabilis*, but it differs from the latter in: median field of the epigynum anchor-shaped (Figs. 113, 114), copulatory duct thin and joined with the base of spermatheca at the ventral side (Fig. 115); tibial apophysis of male palp thick; and distal apophysis with a large central depression (Figs. 116, 117).

Female.—See descriptions of Paik (1969), Song & Zheng (1982) and Zhang (2000). Median field of the epigynum anchor-shaped, but with variations in the width of its top, copulatory duct long and curved, base of spermatheca much longer than head.

Male.—See descriptions of Paik (1969) and Zhang (2000). Base of tibial apophysis of palp

thick, tip pointed; distal apophysis with a large central depression; median apophysis membranous.

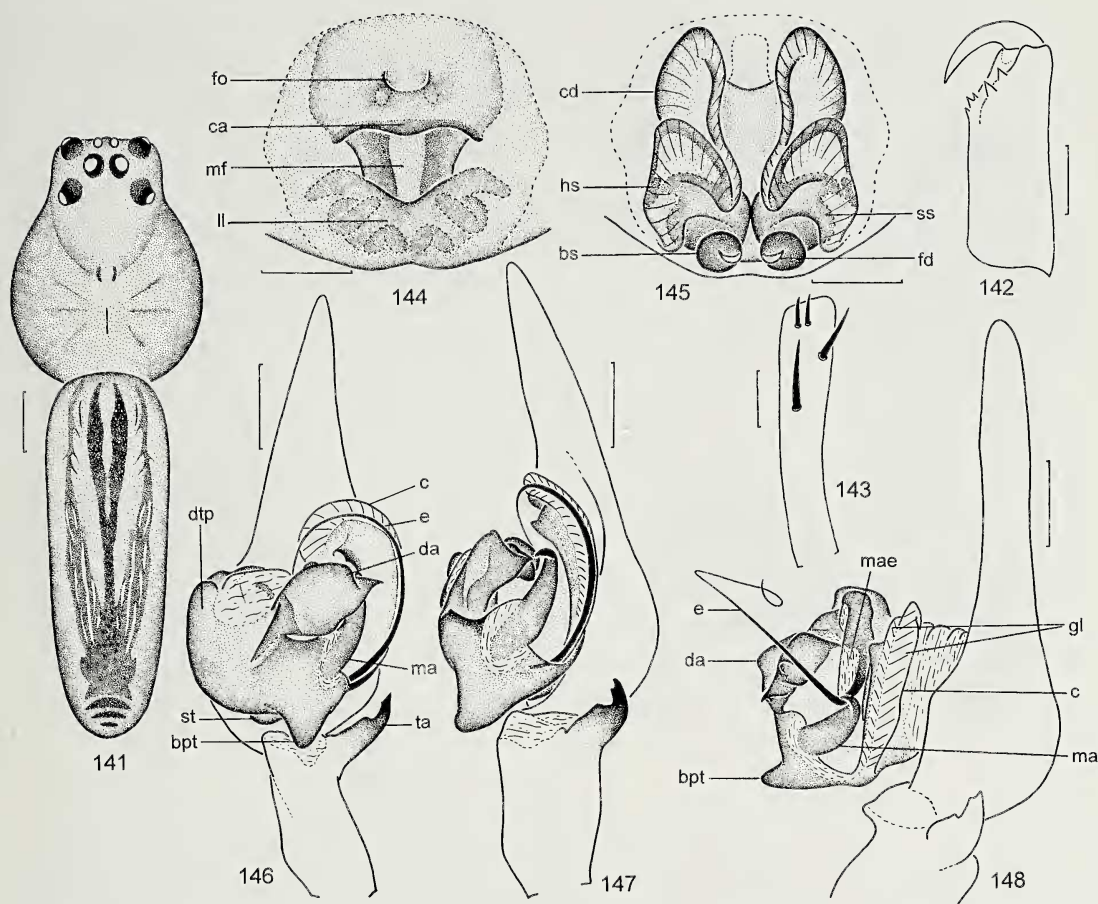
Distribution.—China (Beijing, Hebei, Shanxi, Inner Mongolia, Jilin, Zhejiang, Hubei, Sichuan, Guizhou, Tibet, Shaanxi); Russia, Korea.

Pisaura bicornis Zhang & Song 1992
Figs. 118–123, 226–231

Pisaura bicornis Zhang & Song 1992: 17, figs. 1A–D (holotype female, allotype male from Ningbo, Zhejiang, China, in IZB, examined); Song et al. 1999: 348, figs. 204B, C, I–J; Zhang 2000: 2, figs. 2A–F.

Pisaura lantanus Wang 1993: 158, fig. 11 (holotype female from Chong'an, Fujian, China, in MHU, examined); Song et al. 1999: 348, fig. 204E. First synonymized by Zhang (2000).

Material examined.—Holotype female, al-



Figures 141–148.—*Polyboea zonaformis*. 141. Female, dorsal view; 142. Left chelicera, retrolateral view; 143. Femur of left female palp, dorsal view; 144. Epigynum; 145. Vulva; 146. Left palp of the male, ventral view; 147. Left palp of the male, lateral view; 148. Left palp of the male, expanded. Scale lines: 141 = 1 mm; 142, 143, 146–148 = 0.5 mm; 144, 145 = 0.3 mm.

lotype male of *Pisaura bicornis*, Tiantong Mt., Ningbo, Zhejiang, China, Y.J. Zhang (IZB).

Holotype female of *P. lantanus*, Chong'an, Fujian, China, 13 July 1986, J.F. Wang (MHU).

Diagnosis.—This species can be easily distinguished from others of the genus by chelicera with four promarginal and retromarginal teeth (Fig. 119); tibiae I and II with five pairs of ventral spines; distal end of the tibial apophysis of the male palp with two branches (Fig. 123).

Female.—Described by Zhang & Song (1992) and Zhang (2000). See also description of *P. lantanus* (Wang 1993). Chelicera with four teeth on both margins. Legs with five pairs of ventral spines on tibiae I and II. Me-

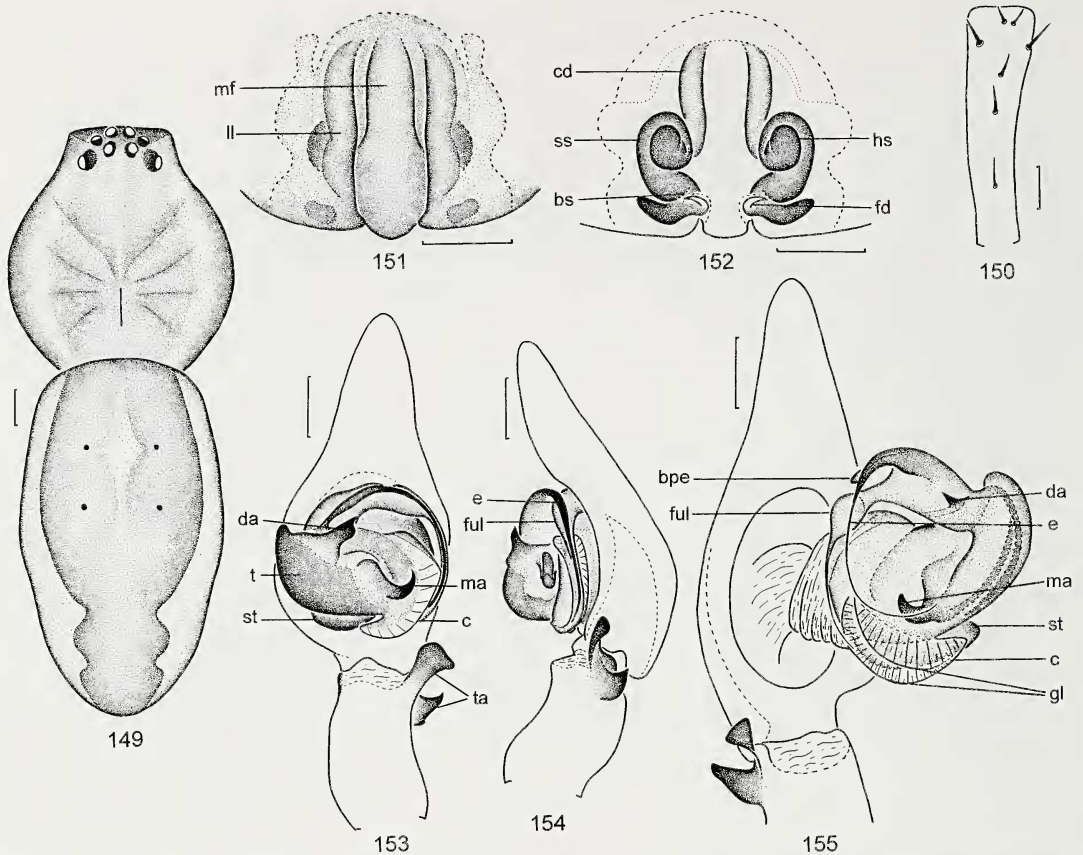
dian field of the epigynum lantern-shaped, copulatory duct long and curved.

Male.—Described by Zhang & Song (1992) and Zhang (2000). Distal end of the tibial apophysis of palp with two branches; median apophysis strongly sclerotized, with its tip hooked.

Distribution.—China (Zhejiang, Fujian).

Pisaura lama Bösenberg & Strand 1906
Figs. 124–127, 232–237

Pisaura lama Bösenberg & Strand 1906: 306, pl. 13, fig. 430 (holotype female from Yokohama, Japan, in Stuttgart Museum, not examined); Paik 1969: 44, figs. 13, 15, 48–53, text-f. 1; Paik 1978: 379, figs. 172.1–6; Song & Zheng 1982: 156, fig. 2; Hu 1984: 262, fig. 275.3; Guo 1985: 135, figs. 2–71.1–2; Yaginuma 1986: 174, fig. 96; Song 1987: 210, fig. 170; Zhang 1987: 168, figs.



Figures 149–155.—*Qianlingula bilamellata*. 149. Female, dorsal view; 150. Femur of left female palp, dorsal view; 151. Epigynum; 152. Vulva; 153. Left palp of the male, ventral view; 154. Left palp of the male, retrolateral view; 155. Right palp of the male, expanded. Scale lines: 149 = 1 mm; 150–155 = 0.5 mm.

142.1–4; Chikuni 1989: 105, fig. 1; Logunov 1990: 37, figs. 2–3; Feng 1990: 163, figs. 138.1–5; Chen & Gao 1990: 137, fig. 172; Chen & Zhang 1991: 227, fig. 236; Song et al. 1999: 348, figs. 204D, K; Song et al. 2001: 269, fig. 169.

Pisaura clarivittata Dönitz & Strand in Bösenberg & Strand, 1906: 389, pl. 6, fig. 76 (data on types not mentioned by authors). First synonymized by Yaginuma (1974).

Pisaura ancora Hu 1984: 261, figs. 275.1–2, 276.1–2 (male, misidentified).

Material examined.—CHINA: *Jilin*: 2 ♀, Liang Mt., 23 April 1960 (MHU); 1 ♀, Linjiang, 7 June 1973 (MHU).

Diagnosis.—This species is closely related to *P. sublama*, but can be distinguished from the latter by the copulatory duct long, base of spermatheca small (Fig. 126); tip of the tibial apophysis of the male palp finger-shaped; and distal end of the distal apophysis not distinctly inflated (Fig. 127).

Female.—See descriptions of Paik (1969), Song & Zheng (1982) and Song (1987). Median field of the epigynum almost “+”-shaped, copulatory duct long and thin, base of spermatheca small.

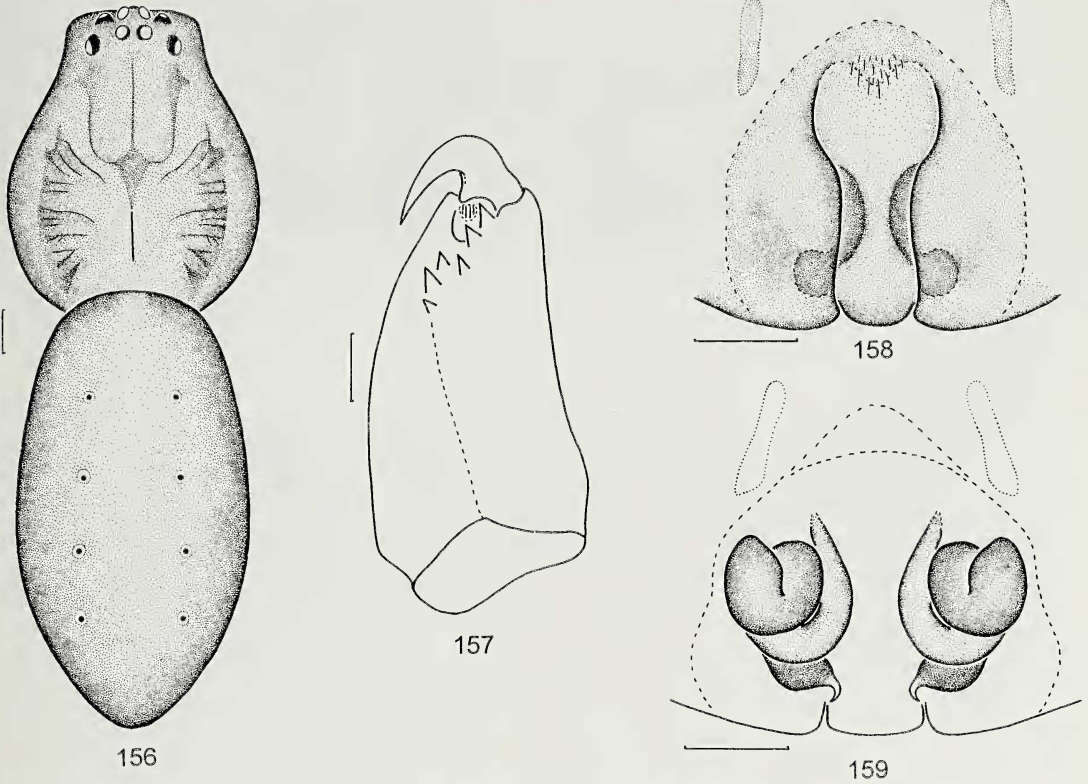
Male.—Described by Paik (1969), Zhang (1987) and Song et al. (2001). The male specimens are not available in this study. Judging from the illustrations by Yaginuma (1986), tibial apophysis of male palp long, with its tip finger-shaped; distal end of the distal apophysis not strongly inflated.

Distribution.—China (Hebei, Jilin, Zhejiang, Hubei, Sichuan, Tibet, Shaanxi); Japan, Korea, Russia.

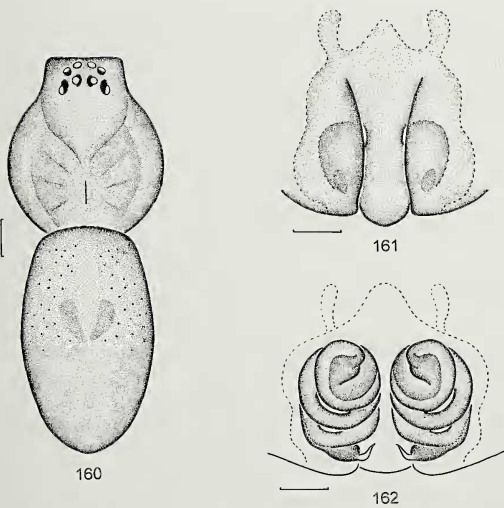
Pisaura mirabilis (Clerck 1757)

Figs. 128–133, 238–243

Araneus mirabilis Clerck 1757: 108, pl. 5, fig. 10 (female and male syntypes from Sweden, presumably lost).



Figures 156–159.—*Qianlingula jiafu*. 156. Female, dorsal view; 157. Left chelicera, prolateral view; 158. Epigynum; 159. Vulva. Scale lines: 156 = 1 mm; 157 = 0.5 mm; 158, 159 = 0.3 mm.

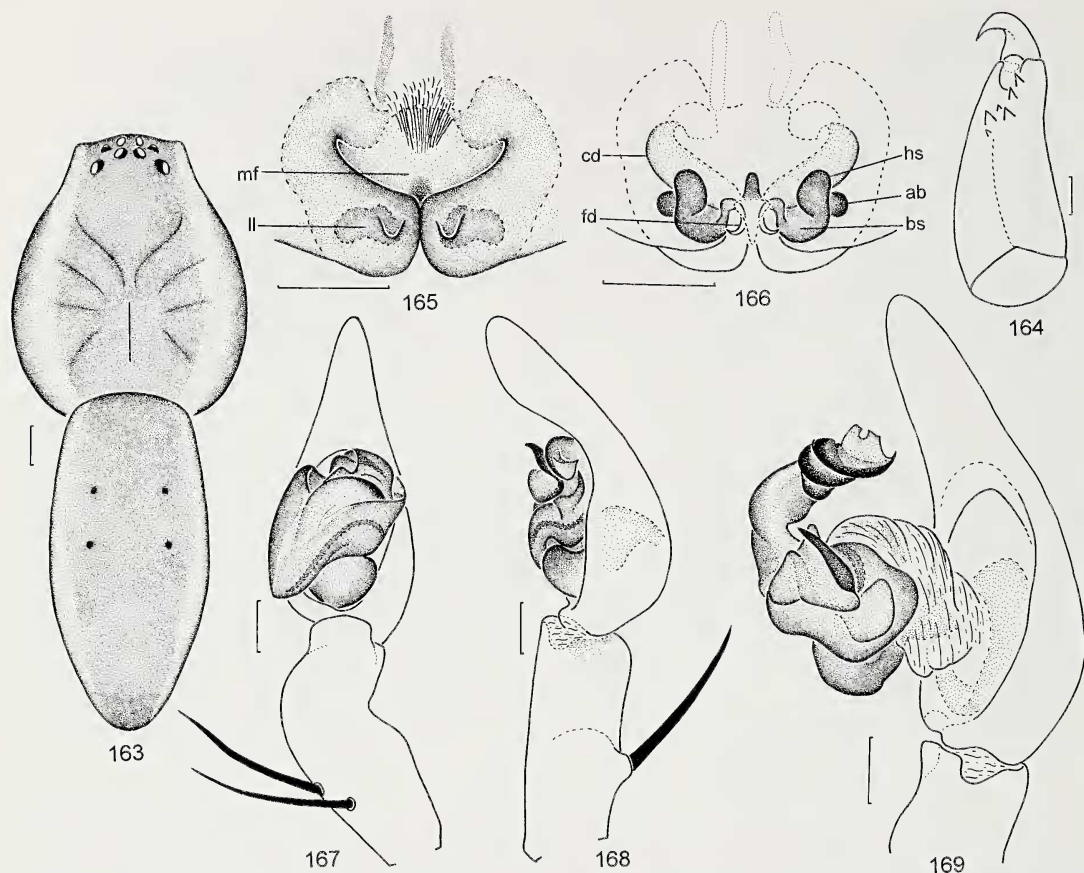


Figures 160–162.—*Qianlingula turbinata*. 160. Female, dorsal view; 161. Epigynum; 162. Vulva. Scale lines: 160 = 2 mm; 161, 162 = 0.5 mm.

Pisaura mirabilis: Simon 1885b: 354; Locket & Millidge 1951: 293, figs. 141, 142A–B; Miller 1971: 171, pl. XXVII, figs. 13–14; Blandin 1976: 919, figs. 1, 7a, 10, 13, 15, 18; Hu 1984: 263, figs. 277.1–2; Song 1987: 211, fig. 171; Hu & Wu 1989: 241, figs. 198.1–2; Sierwald 1990: 31, figs. 7, 30, 45; Logunov 1990: 37, figs. 2–3; Heimer & Nentwig 1991: 350, figs. 9–11; Zhao 1993: 307, fig. 141; Roberts 1995: 237, fig. 19; Levy 1999: 55, figs. 29A–C, 30A–F; Song et al. 1999: 348, figs. 204F, N; Zhang 2000: 4, figs. 4A–F; Hu 2001: 220, figs. 116.1–4.

Material examined.—CHINA: *Xinjiang*: 4 ♀, 3 ♂, Manasi, 2 May 1981, H.Z. Wang (IZB); 2 ♀, Cha County, Ili, 14 June 1981, H.Z. Wang (MHU).

Diagnosis.—The species resembles *P. ancora* in the shape of the epigynum, but it differs from the latter in the copulatory duct thick, and joined with the base of spermatheca at the dorsal side (Fig. 131); tibial apophysis of the male palp thin, with its tip hooked; and the distal apophysis lacking central depression (Figs. 132, 133).



Figures 163–169.—*Thalassius parabolicinctus*. 163. Female, dorsal view; 164. Left chelicera, prolateral view; 165. Epigynum; 166. Vulva; 167. Left palp of the male, ventral view; 168. Left palp of the male, retrolateral view; 169. Left palp of the male, expanded. Scale lines: 163 = 2 mm; 164 = 1 mm; 165–169 = 0.5 mm.

Female.—See descriptions of Song (1987), Zhang (2000) and Hu (2001). Median field of the epigynum with a small depression anteriorly, copulatory duct long and curved, joined with the base of spermatheca at the dorsal side.

Male.—See descriptions of Song (1987), Sierwald (1990), Zhang (2000) and Hu (2001). Tip of the tibial apophysis of palp hooked; distal apophysis with several parallel longitudinal ridges at the center.

Distribution.—China (Tibet, Gansu, Xinjiang); Palearctic.

Pisaura sublama Zhang 2000

Figs. 134–140, 244–249

Pisaura sublama Zhang 2000: 5, figs. 6A–E (holotype female, 1 female, 2 male paratypes from Zhouzhi, Shaanxi, China, in MHU, examined).

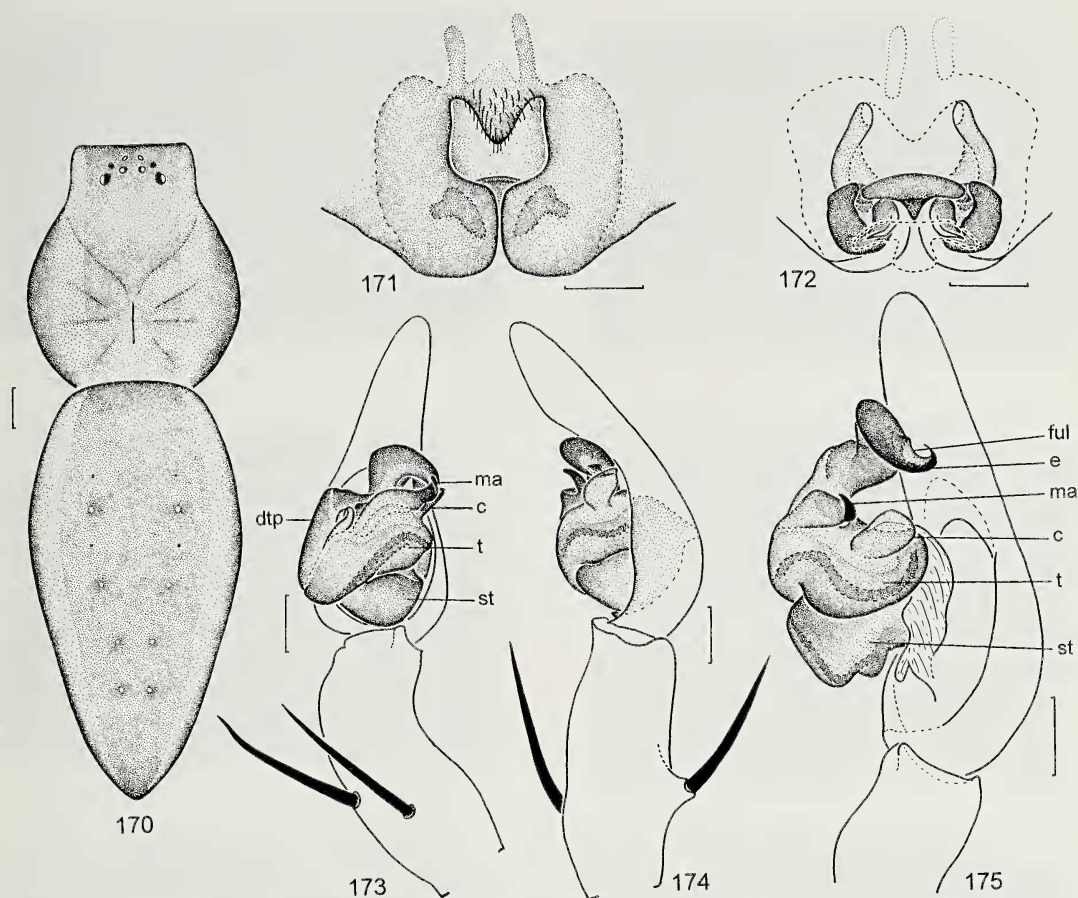
Material examined.—Holotype female, 1

female, 2 male paratypes, Louguantai, Zhouzhi, Shaanxi, China, 19 May 1981, M. S. Zhu (MHU). CHINA: *Shandong*: 2 ♀, 1 ♂, Lao Mt., Qingdao, 23 June 1987, J.L. Hu (MHU); *Sichuan*: 3 ♀, Xiaomiao Mt., Mao County, 22 July 1999, G.D. Ren (MHU).

Diagnosis.—The species is similar to *P. lama*, but can be distinguished from the latter by the copulatory duct short (Fig. 137); tip of the tibial apophysis of the male palp pointed; and the distal end of the distal apophysis inflated (Figs. 138–140).

Female.—Described by Zhang (2000). Median field of the epigynum with a small depression at the anterior part, posterior part narrow, copulatory duct short and not strongly coiled.

Male.—Described by Zhang (2000). Tip of the tibial apophysis of the palp pointed and



Figures 170–175.—*Thalassius phipsoni*. 170. Female, dorsal view; 171. Epigynum; 172. Vulva; 173. Left palp of the male, ventral view; 174. Left palp of the male, retrolateral view; 175. Left palp of the male, expanded. Scale lines: 170 = 2 mm; 171–175 = 0.5 mm.

spinous; distal end of the distal apophysis inflated and round.

Distribution.—China (Shandong, Sichuan, Shaanxi).

Polyboea Thorell 1895

Polyboea Thorell 1895: 228; Sierwald 1997: 401; Zhang & Zhang 2003: 15.

Type species.—*Polyboea vulpina* Thorell 1895, by monotypy.

Diagnosis.—This genus is closely related to *Perenethis*, but differs from the latter in: anterior and posterior eye rows almost equal in width, ALE larger than AME and PME; tibia of leg lacking a pair of short ventral spines at the distal end; carina of the epigynum entire (Fig. 144); conductor of the male palpal organ with two guiding lamellae (Fig. 148).

Remarks.—This genus has reported only two species, found in China (one species), Thailand, Malaysia and Singapore (one species).

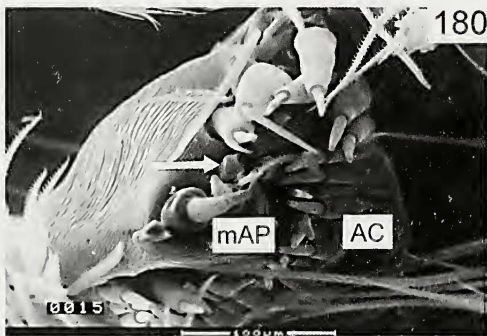
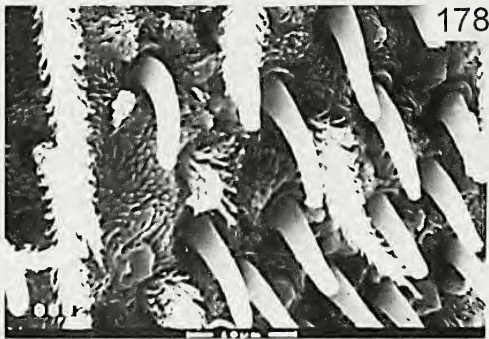
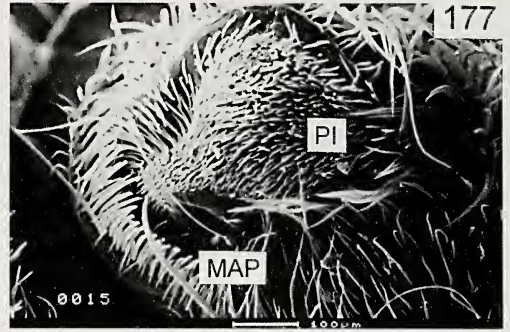
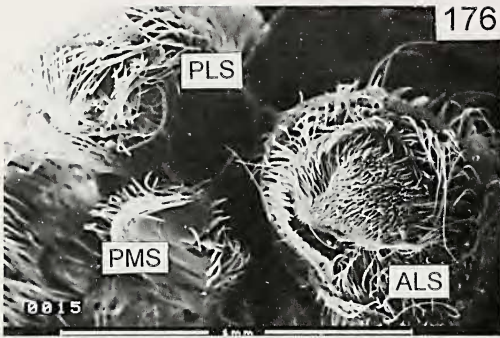
Polyboea zonaformis (Wang 1993)

Figs. 141–148, 250–255

Pisaura zonaformis Wang 1993: 157: figs. 6–10 (holotype female, allotype male from Menglun, Yunnan, China, in MHU, examined); Song et al. 1999: 353, figs. 204G–H, L–M.

Polyboea zonaformis: Zhang & Zhang 2003: 15, figs. 2A–G.

Material examined.—Holotype female, allotype male, Menglun, Yunnan, China, 30 July 1981, J.F. Wang (MHU). CHINA: *Yunnan*: 2 ♀, 3 ♂, Mengla, 26 July 2000, J.X. Zhang (MHU); 1 ♀, Daluo, Menghai, 31 July 2000, M.S. Zhu (MHU); 1 ♂, Menglun, 6 July 2001, C. Zhang (MHU).

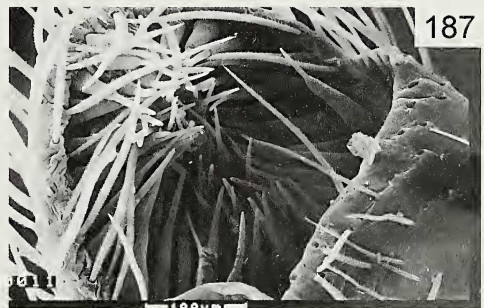
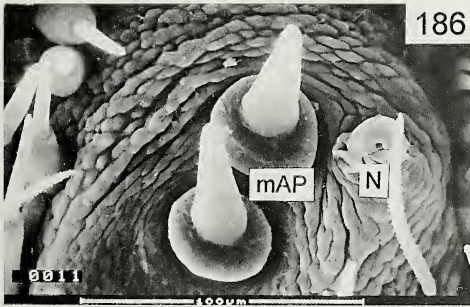
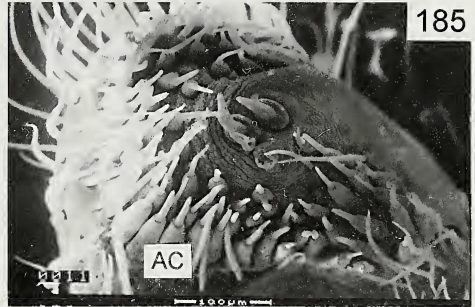
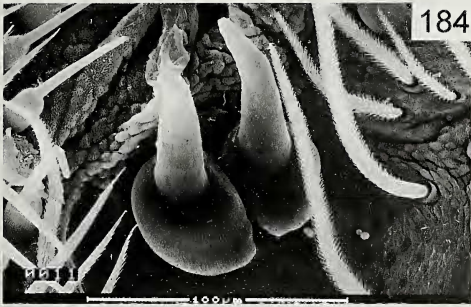
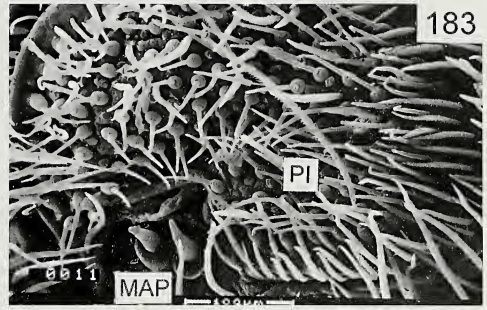
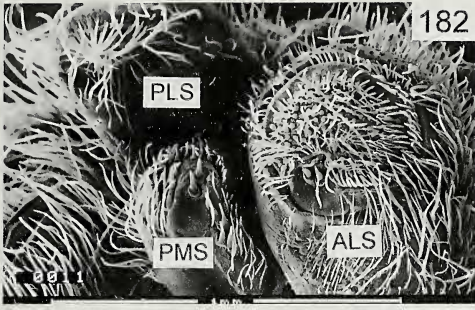


Figures 176–181.—Spinnerets of female *Dianpisaura lizhii*. 176. Right spinneret group, $\times 80$; 177. ALS, $\times 150$; 178. PI in ALS, $\times 2000$; 179. MAP in ALS, $\times 600$; 180. PMS, $\times 350$; 181. PLS, $\times 200$ (white arrow refers to nubbin).

Diagnosis.—This species resembles *P. vulpina* in the shape of male palpal organ (Sierwald 1997: 401, figs. 88–90, 97–101), but it differs from the latter in: anterior depression of the epigynum small, carina not horizontal, but ripple-like (Fig. 144); base of spermatheca small and oval (Fig. 145); base of the tibial apophysis of the male palp thick; distal end of the distal apophysis beak-shaped (Figs. 146–148).

Female.—Described by Wang (1993) and Zhang & Zhang (2003). Epigynum with a small anterior semi-circular depression; copulatory duct wide, membranous and saccate, forming two loops; base of spermatheca oval.

Male.—Described by Wang (1993) and Zhang & Zhang (2003). Base of the tibial apophysis of the palp thick, tip with two small branches; basal protuberance of the tegulum



Figures 182–187.—Spinnerets of female *Dolomedes nigrimaculatus*. 182. Right spinneret group, $\times 80$; 183. ALS, $\times 250$; 184. MAP in ALS, $\times 600$; 185. PMS, $\times 230$; 186. mAP and N in PMS, $\times 650$; 187. PLS, $\times 230$.

large; distal end of the distal apophysis beak-shaped.

Distribution.—China (Yunnan).

***Qianlingula* new genus**

Type species.—*Qianlingula bilamellata* new species.

Diagnosis.—The new genus is related to *Thalassius* in body shape and eye pattern, but can be easily distinguished from the latter by: median field of epigynum strongly sclerotized, posterior margin of lateral lobe far from each

other (Fig. 151); male palp with distinct lamellar tibial apophysis; palpal organ with distal apophysis; tip of fulcrum fine; conductor with two guiding lamellae (Figs. 153–155).

Description.—Body medium-sized or large. Carapace yellow brown or dark red brown. Both eye rows recurved, posterior eyes larger than anterior eyes, AME equal to PME. Femur of palp with seven dorsal spines. Chelicera with three teeth on both margins. Labium slightly longer than wide. Unpaired tarsal claw with two teeth. Abdomen oval.

Posterior margins of lateral lobes far from each other, median field strongly sclerotized and tongue-shaped; spermatheca with head, stalk and base, copulatory duct joined with the spermatheca at the stalk. Tibial apophysis of the male palp lamellar; distal apophysis of palpal organ small, embolus accompanied by

a fine fulcrum, conductor with two guiding lamellae.

Etymology.—The generic name is from the Latin *lingula*, and refers the median field of the tongue-shaped epigynum; “Qian” in Chinese is an alternative name for Guizhou Province; feminine in gender.

KEY TO CHINESE *QIANLINGULA* SPECIES

1. Female 2
Male; tibial apophysis of male palp lamellar; median apophysis hook-shaped, embolus slender and flagelliform (Figs. 153–155) *Q. bilamellata*
2. Body large (20.00–24.00); lateral lobes of epigynum separated outwards at anterior part (Fig. 161); stalk of spermatheca long and coiled (Fig. 162) *Q. turbinata*
Body small (11.88–13.95); lateral lobes of epigynum otherwise; stalk of spermatheca short and not coiled 3
3. Lateral margins of lateral lobe of epigynum almost parallel (Fig. 151); base of spermatheca with a finger-shaped projection (Fig. 152) *Q. bilamellata*
Lateral margins of lateral lobe of epigynum protruding outwards at anterior part (Fig. 158); base of spermatheca lacking finger-shaped projection (Fig. 159) *Q. jiafu*

Qianlingula bilamellata new species

Figs. 149–155, 256–261

Material examined.—Holotype female, Meitan (27°42'N, 107°24'E), Guizhou, China, 10 May 1981, F. J. Li (MHU). Paratypes: 3 females, 1 male, same data as holotype (MHU); 4 ♀, Yuelu Mt. (28°06'N, 112°54'E), Changsha, Hunan, China, 14 May 1980, J. F. Wang (MHU).

Diagnosis.—The new species can be easily distinguished from the other two species of the genus by lateral margins of lateral lobes of the epigynum parallel, median field quadrate (Fig. 151); base of spermatheca with a finger-shaped projection (Fig. 152).

Female.—Total length 12.60–13.95. Holotype total length 13.95: cephalothorax 5.22 long, 4.50 wide; abdomen 9.00 long, 5.40 wide. Carapace yellow brown, with lateral yellow bands. Chelicerae red brown. Labium, endites and legs yellow brown. Sternum yellow. Dorsum of abdomen gray brown, with a rhomboid yellowish cardiac marking at the center of anterior part. Chelicerae with 3 teeth on both margins. Both eye rows recurved. AME–AME:AME–ALE (0.17:0.09), PME–PME:PME–PLE (0.22:0.39); AME:ALE:PME:PLE (0.27:0.24:0.27:0.29). MOA 0.71 long, front width 0.65, back width 0.68. Measurements of legs: I 27.36 (7.29, 9.90, 7.20, 2.97), II 29.57 (7.88, 10.62, 8.10, 2.97), III

21.47 (6.21, 7.56, 5.54, 2.16), IV 25.97 (7.20, 8.64, 7.52, 2.61). Leg formula: 2, 1, 4, 3. Tibiae I and II with four pairs of ventral spines, III and IV with three pairs. Median field of the epigynum tongue-shaped; base of spermatheca with a finger-shaped projection.

Male.—Total length 11.70: cephalothorax 5.40 long, 5.04 wide; abdomen 6.75 long, 4.05 wide. Characters as in holotype female. Measurements of palp and legs: palp 7.47 (2.70, 1.08, 0.99, 2.70); leg I (7.65, 10.58, lost, lost), II 31.73 (8.46, 11.25, 8.37, 3.65), III 22.65 (6.53, 7.79, 5.94, 2.39), IV 44.79 (7.70, 9.36, 7.65, 3.02). Tibial apophysis of palp lamellar in shape; median apophysis of palpal organ small, embolus slender, conductor with two guiding lamellae (Figs. 153–155).

Etymology.—The specific name is from the Latin *lamellata*, and refers to the tibial apophysis of male palp lamellar in shape.

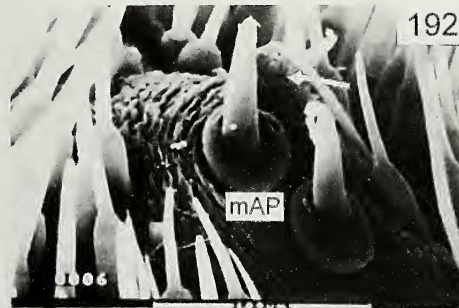
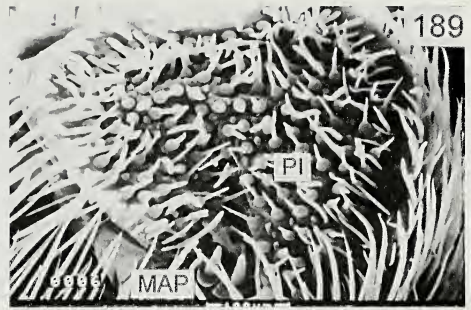
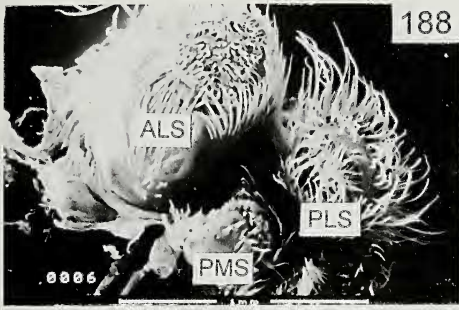
Distribution.—China (Guizhou, Hunan).

Qianlingula jiafu new species

Figs. 156–159

Material examined.—Holotype female, from Zhangjiajie, Dayong (29°06'N, 110°24'E), Hunan, China, 20 July 1981, J.F. Wang (MHU). Paratypes: 3 females, same data as holotype (MHU).

Diagnosis.—The new species is similar to

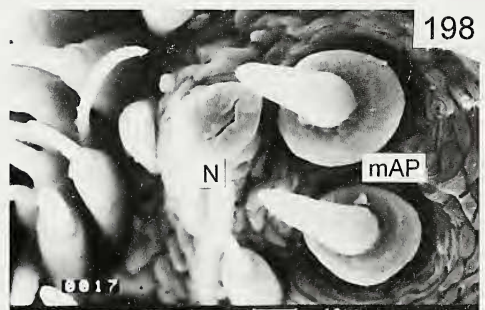
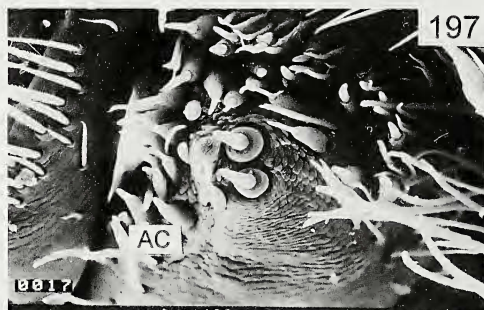
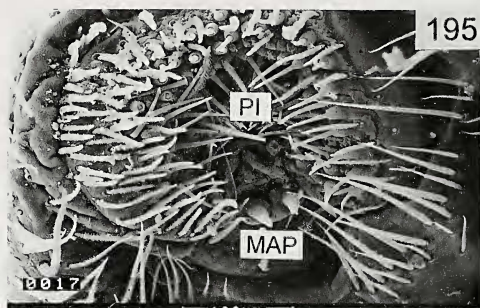
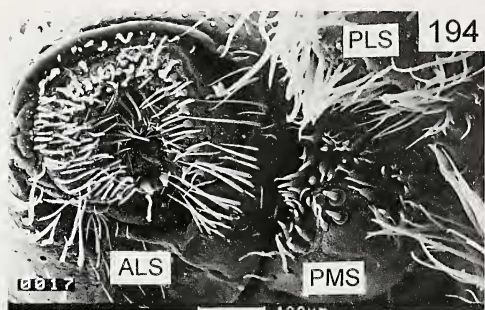


Figures 188–193.—Spinnerets of female *Dolomedes raptor*. 188. Left spinneret group, $\times 60$; 189. ALS, $\times 200$; 190. PI in ALS, $\times 500$; 191. PMS, $\times 250$; 192. mAP and N in PMS, $\times 650$; 193. PLS, $\times 700$ (white arrow refers to nubbin).

Q. bilamellata in the body shape, but can be distinguished from the latter by the lateral margins of lateral lobes of the epigynum not parallel (Fig. 158), base of spermatheca lacking finger shaped projection (Fig. 159). It differs from *Q. turbinata* in the median field of the epigynum with a depression on each side at the center (Fig. 158), stalk of spermatheca short and not coiled (Fig. 159).

Female.—Total length 11.88–12.50. Holotype total length 11.88: cephalothorax 5.09

long, 4.37 wide; abdomen 7.29 long, 4.05 wide. Carapace dark red brown, with many dark brown streaks. Chelicerae dark red brown. Labium and endites dark red. Sternum gray brown. Legs red brown. Dorsum of abdomen dark brown, with four pairs of red brown dots and a rhomboid brownish patch. Chelicerae with three teeth on both margins. Both eye rows recurved. AME–AME:AME–ALE (0.23:0.13); PME–PME:PME–PLE (0.20:0.35). AME:ALE:PME:PLE (0.23:0.21:



Figures 194–199.—Spinnerets of female *Dolomedes sulfureus*. 194. Left spinneret group, $\times 150$; 195. ALS, $\times 250$; 196. MAP in ALS, $\times 1200$; 197. PMS, $\times 300$; 198. mAP and N in PMS, $\times 1000$; 199. PLS, $\times 300$.

0.23:0.26). MOA 0.70 long, front width 0.62, back width 0.65. Measurements of legs: I 26.33 (6.75, 10.49, 6.84, 2.25), II 26.92 (7.43, 9.81, 7.29, 2.39), III 22.69 (6.03, 8.65, 6.03, 1.98), IV 25.26 (7.07, 8.60, 7.20, 2.39). Leg formula: 2, 1, 4, 3. Tibiae I and II with four pairs of ventral spines, III and IV with three pairs. Median field of the epigynum with a depression on each side at the center, stalk of spermatheca short and not coiled.

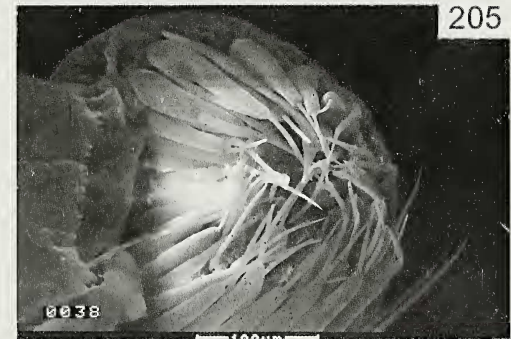
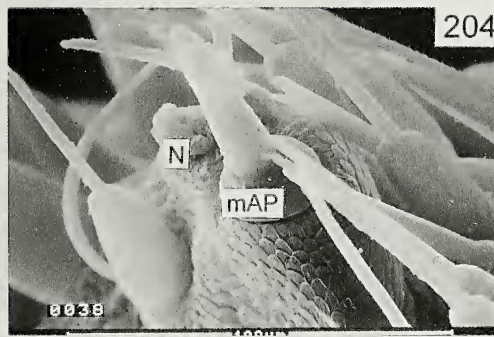
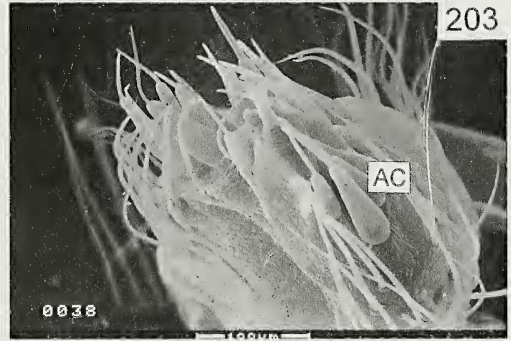
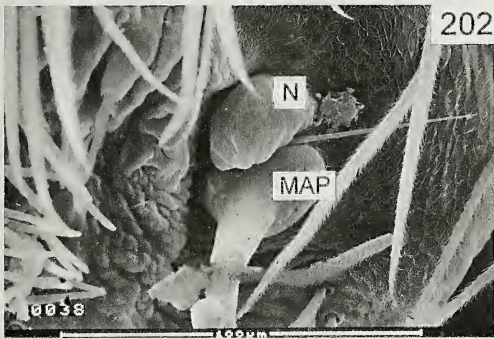
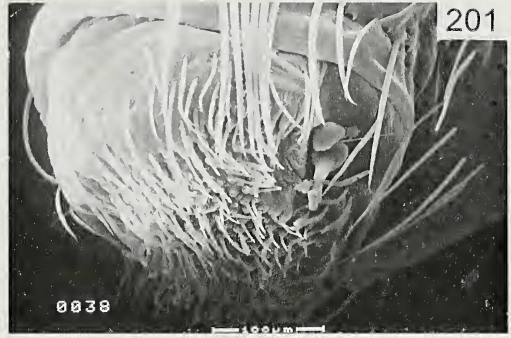
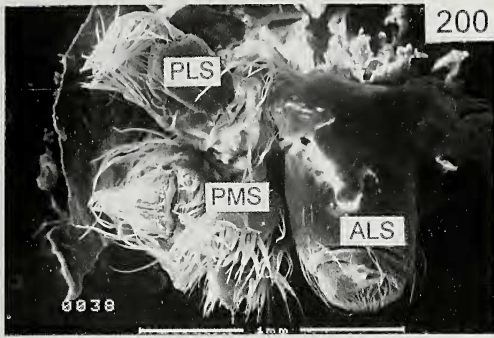
Male.—Unknown.

Etymology.—The specific name is a noun in apposition taken from the first name of the collector.

Distribution.—China (Hunan).

Qianlingula turbinata new species
Figs. 160–162

Material examined.—Holotype female, Chengbu (26°18'N, 110°18'E), Hunan, China, 5 August 1982, J.F. Wang (MHU). Paratypes: CHINA: Hunan: 1 ♀, same data as holotype

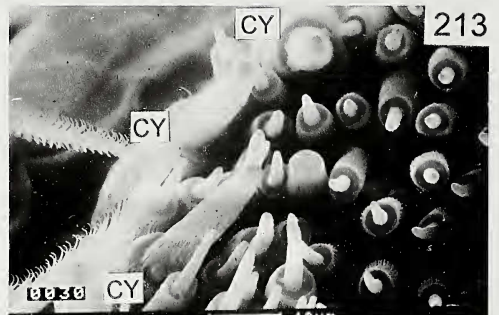
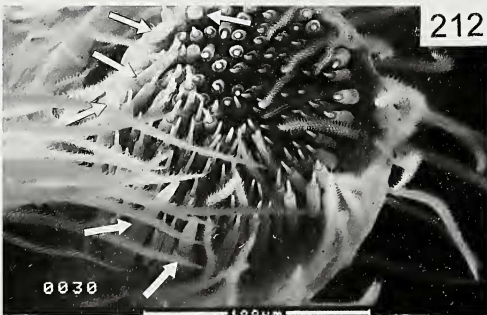
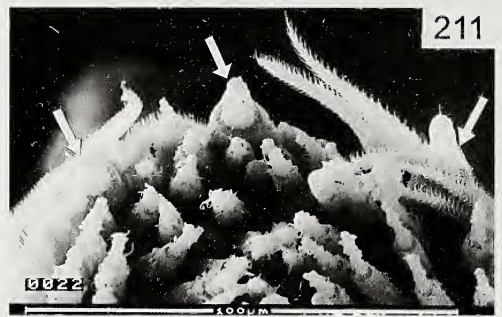
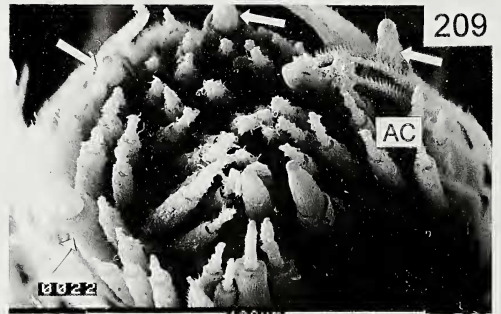
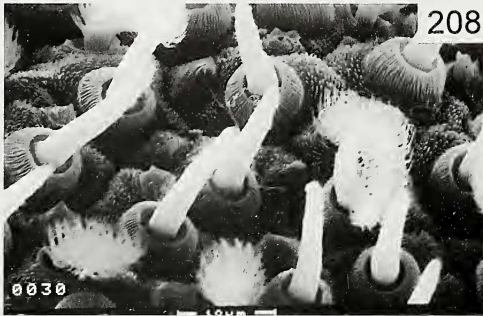
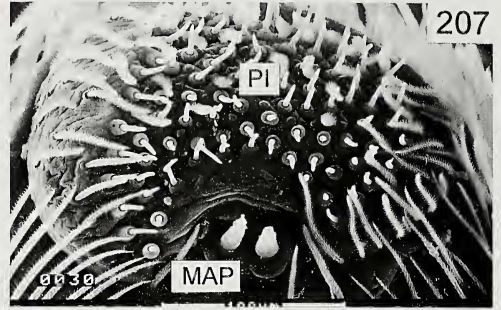
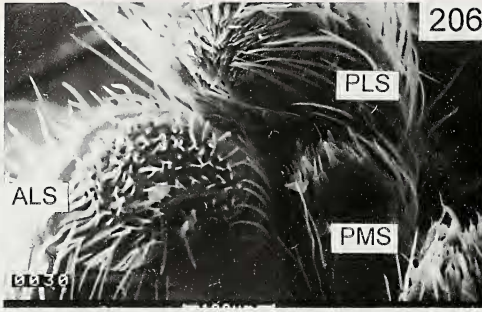


Figures 200–205.—Spinnerets of female *Eurychoera banna*. 200. Right spinneret group, $\times 60$; 201. ALS, $\times 250$; 202. MAP and N in ALS, $\times 870$; 203. PMS, $\times 250$; 204. mAP and N in PMS, $\times 870$; 205. PLS, $\times 276$.

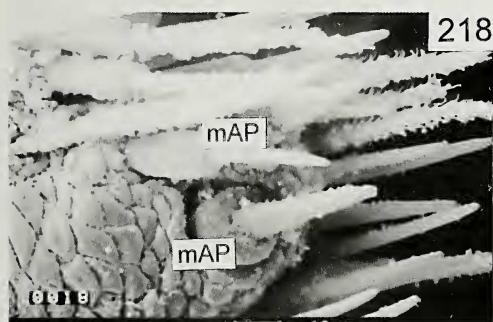
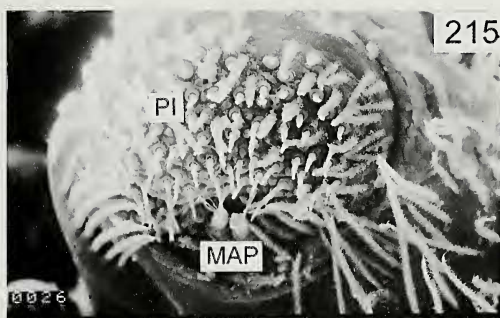
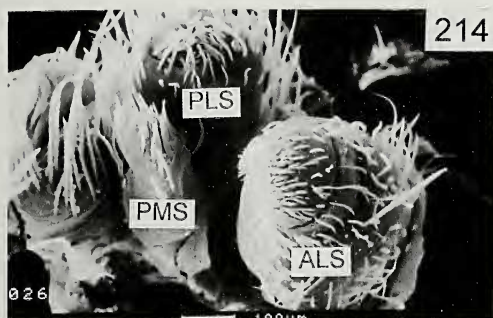
(MHU); 2 ♀, Ling County (26°30'N, 113°42'E), 16 August 1979, J.F. Wang (MHU); 1 ♀, Zhangjiajie, Dayong (29°06'N, 110°24'E), 20 July 1981, J.F. Wang (MHU); Guizhou: 2 ♀, Meitan (27°42'N, 107°24'E), 4 May 1981, F.J. Li (MHU); Hainan: 1 ♀, Wuzhi Mt. (18°48'N, 109°30'E), Qiongzong, 27 June 1984, M.Y. Liu (MHU); Fujian: 2 ♀, 21 July 1986, J.F. Wang (MHU).

Diagnosis.—Body large (20.00–24.00). The new species resembles *Q. jiafu* in the shape of epigynum, but can be easily distinguished from the latter by lateral lobes of the epigynum separated outwards at anterior part (Fig. 161); base of spermatheca small, stalk of spermatheca long and coiled (Fig. 162).

Female.—Total length 20.00–24.00. Holotype total length 24.00: cephalothorax 8.73



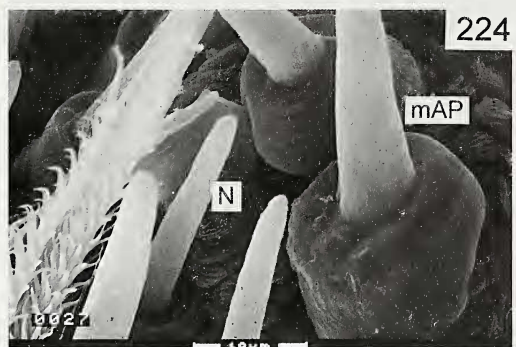
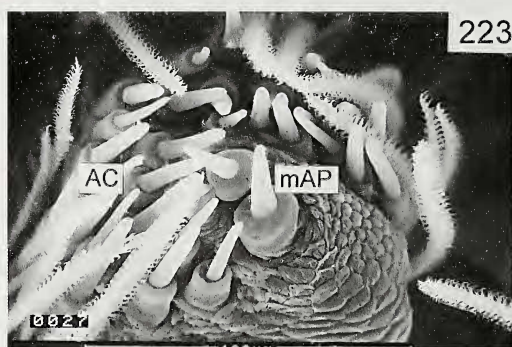
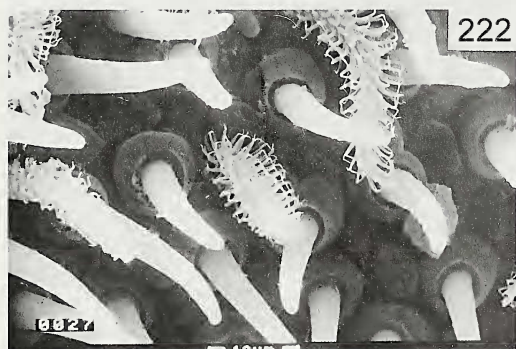
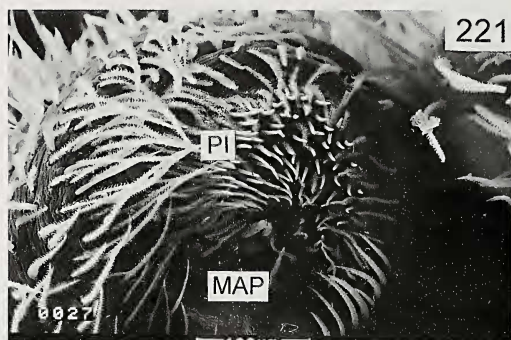
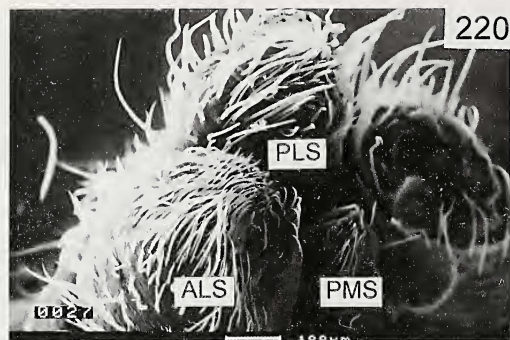
Figures 206–213.—Spinnerets of female *Hygropoda higenaga*. 206. Left spinneret group, $\times 200$; 207. ALS, $\times 410$; 208. PI in ALS, $\times 2200$; 209. PMS, $\times 750$; 210. mAP and N in PMS, $\times 1200$; 211. CY in PMS, $\times 960$; 212. PLS, $\times 505$; 213. CY in PLS, $\times 1650$ (black arrow refers to nubbin, white arrows refer to cylindrical gland spigots).



Figures 214–219.—Spinnerets of female *Perenethis fascigera*. 214. Right spinneret group, $\times 220$; 215. ALS, $\times 400$; 216. PI in ALS, $\times 1500$; 217. PMS, $\times 500$; 218. mAP in PMS, $\times 1000$; 219. PLS, $\times 550$.

long, 6.98 wide; abdomen 16.00 long, 9.00 wide. Carapace red brown. Chelicerae dark red. Labium and endites dark red brown and lighter distally. Sternum yellow brown. Legs red brown without darker color markings. Abdomen grayish brown scattered with many small black spots at the anterior part. Cardiac mark yellowish brown with one dark brown patch at each side. Chelicerae with three teeth on both margins. Both eye rows recurved.

AME–AME:AME–ALE (0.20:0.14); PME–PME:PME–PLE (0.29:0.51). AME:ALE:PME:PLE (0.41:0.37:0.41:0.48). MOA 1.07 long, front width 0.95, back width 1.05. Measurements of legs: I 46.89 (13.14, 17.10, 12.78, 3.87), II 49.96 (13.95, 17.87, 13.95, 4.19), III 43.11 (12.60, 15.12, 11.52, 3.87), IV 48.87 (14.04, 16.38, 14.58, 3.87). Leg formula: 2, 4, 1, 3. Tibiae I and II with four pairs of ventral spines, III and IV with three pairs.



Figures 220–225.—Spinnerets of female *Pisaura ancora*. 220. Left spinneret group, $\times 125$; 221. ALS, $\times 250$; 222. PI in ALS, $\times 2000$; 223. PMS, $\times 500$; 224. mAP and N in PMS, $\times 2000$; 225. PLS, $\times 400$.

Tarsus with scopula ventrally. Median field of epigynum sclerotized and stalk of spermatheca coiled.

Male.—Unknown.

Etymology.—The specific name is from the Latin *turbinata*, and refers to the shape of the curved spermatheca.

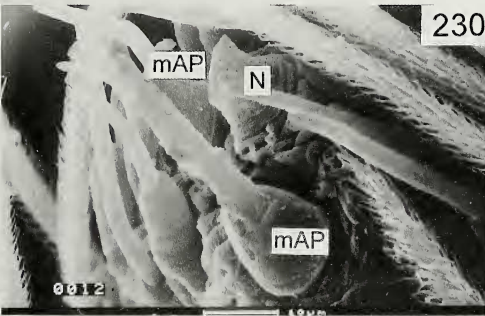
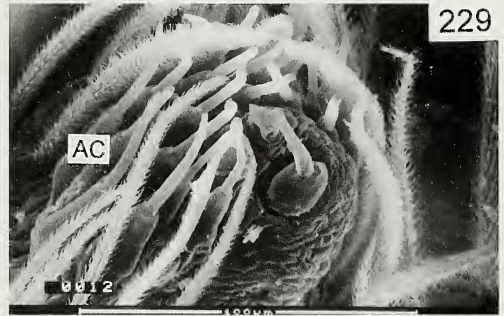
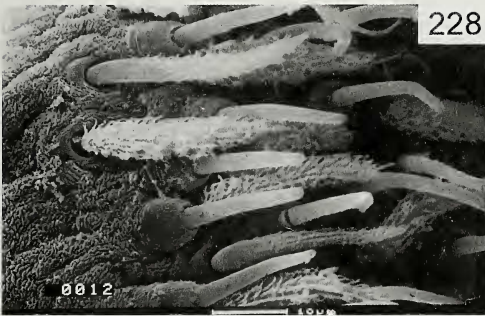
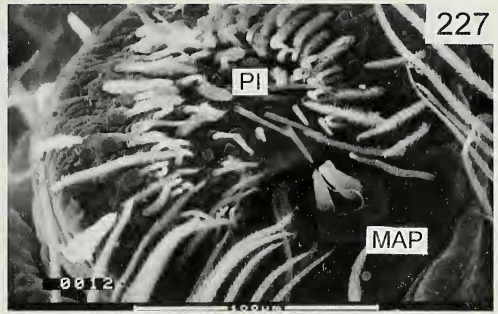
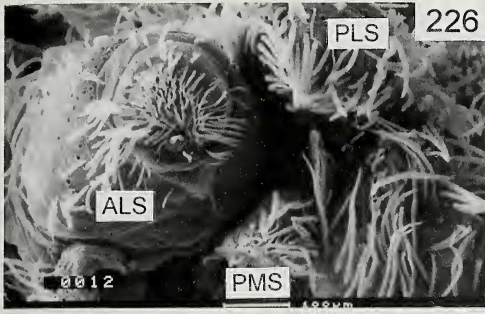
Distribution.—China (Hunan, Guizhou, Hainan, Fujian).

Thalassius Simon 1885

Thalassius Simon 1885a: 13; Sierwald 1983: 203; Hu 1984: 264; Sierwald 1987: 131; Chen & Zhang 1991: 225; Barrion & Litsinger 1995: 350.

Type species.—*Dolomedes albocinctus* Doleschall 1859, by subsequent designation of Simon (1898).

Diagnosis.—This genus is closely related to *Dolomedes* in body shape, median field of

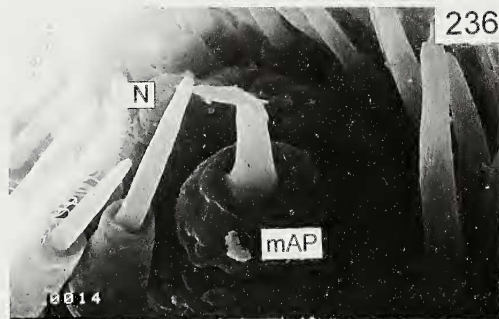
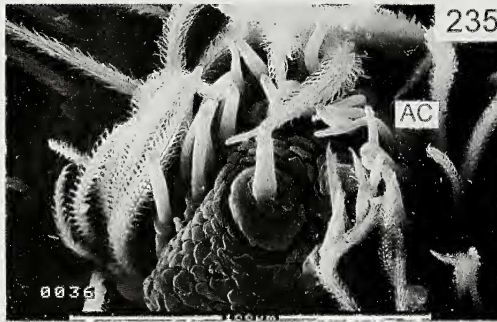
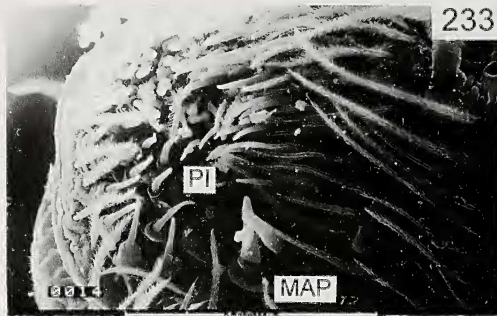
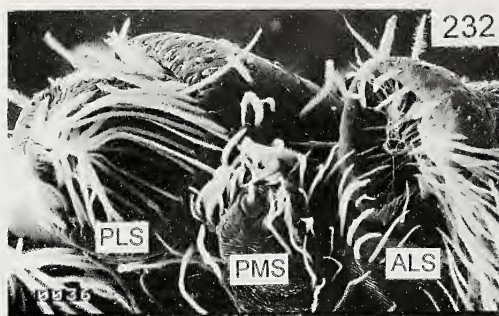


Figures 226–231.—Spinnerets of female *Pisaura bicornis*. 226. Left spinneret group, $\times 150$; 227. ALS, $\times 550$; 228. PI in ALS, $\times 1800$; 229. PMS, $\times 800$; 230. mAP and N in PMS, $\times 1800$; 231. PLS, $\times 400$.

the epigynum not strongly sclerotized, and male palpal organ with fulcrum, but can be distinguished from the latter by the anterior eye row strongly recurved; chelicera with three retromarginal teeth; spermatheca short and thick, not strongly coiled (e.g., Fig. 166); tibial apophysis of male palp small or reduced; and palpal organ lacking saddle (e.g., Figs. 173–175).

This genus comprises 17 species distributed in Africa (eight species), Madagascar (four

species), southeast Asia (four species) and Middle East (one species). Among them, *T. bottrelli* Barrion and Litsinger 1995 (Barrion & Litsinger 1995: 350, figs. 207a–d, female) and *T. balingkinitanus* Barrion and Litsinger 1995 (Barrion & Litsinger 1995: 352, figs. 208a–f, male) from Philippines should be transferred to *Hygropoda* [*Hygropoda bottrelli* (Barrion and Litsinger 1995) NEW COMBINATION and *Hygropoda balingkinitanus* Barrion and Litsinger 1995 NEW COMBI-



Figures 232–237.—Spinnerets of female *Pisaura lama*. 232. Right spinneret group, $\times 145$; 233. ALS, $\times 600$; 234. PI in ALS, $\times 2000$; 235. PMS, $\times 850$; 236. mAP and N in PMS, $\times 1500$; 237. PLS, $\times 550$.

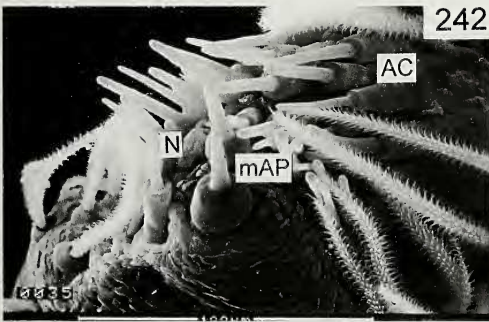
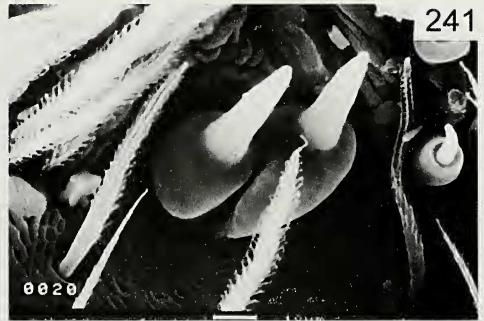
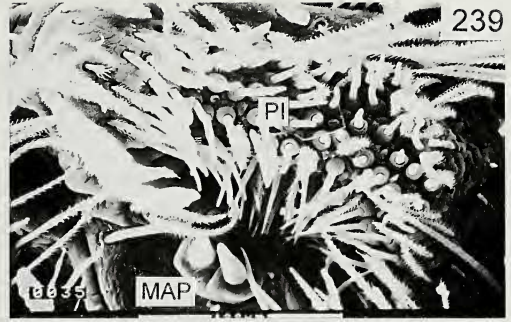
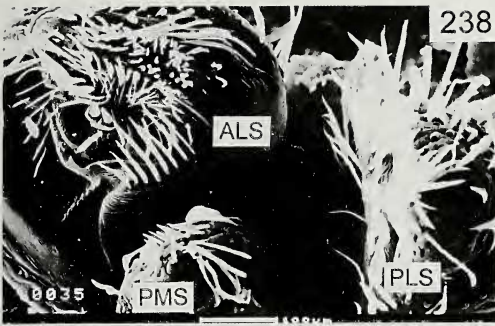
NATION] due to the long and flexible tarsi of the legs and the male palpal patella longer than tibia.

Only one species (*T. phipsoni* F.O.P.-Cam-

bridge 1898) has been previously recorded from our fauna. A new species under the name of *T. paralbocinctus* is added and reported here.

KEY TO CHINESE *THALASSIUS* SPECIES

- 1. Female 2
- Male 3
- 2. Lateral margins of lateral lobe of epigynum parallel (Fig. 171); head of spermatheca almost boot-shaped (Fig. 172) *T. phipsoni*



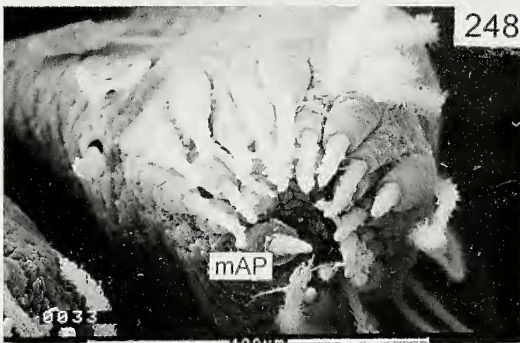
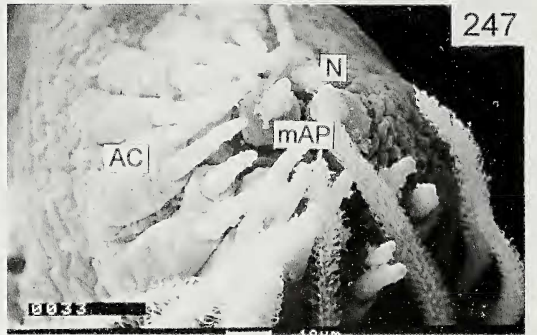
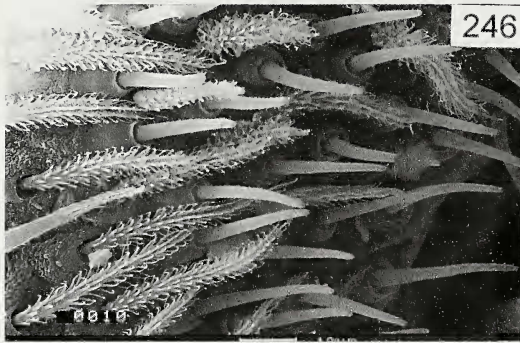
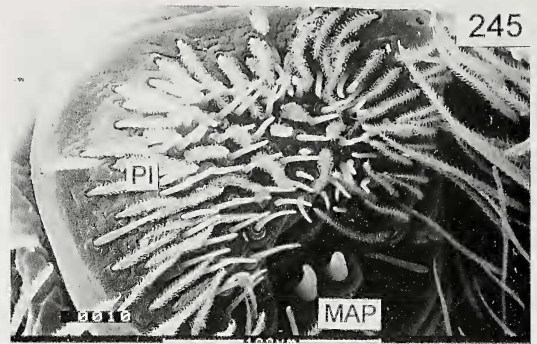
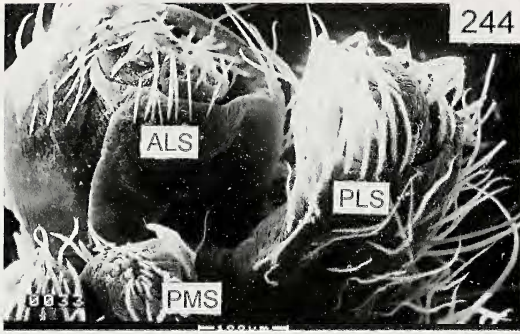
Figures 238–243.—Spinnerets of female *Pisaura mirabilis*. 238. Left spinneret group, $\times 180$; 239. ALS, $\times 470$; 240. PI in ALS, $\times 1500$; 241. MAP in ALS, $\times 1000$; 242. PMS, $\times 680$; 243. PLS, $\times 500$.

- Lateral margins of lateral lobe of epigynum not parallel (Fig. 165); head of spermatheca round (Fig. 166) *T. paralbocinctus*
3. Median apophysis of palpal organ small and hooked, embolus sickle-shaped (Figs. 173–175) *T. phipsoni*
- Median apophysis of palpal organ large and wide, embolus coiled spirally (Figs. 167–169) *T. paralbocinctus*

Thalassius paralbocinctus new species
Figs. 163–169

Material examined.—Holotype female, Mengla (21°24'N, 101°30'E), Yunnan, China,

24 July 2000, M.S. Zhu (MHU). Paratypes: CHINA: Yunnan: 2 ♀, 2 ♂, Daluo (21°36'N, 100°00'E), Menghai, 31 July 2000, M.S. Zhu and G.M. Tang (MHU); Guangxi: 1 ♀, 1 ♂,



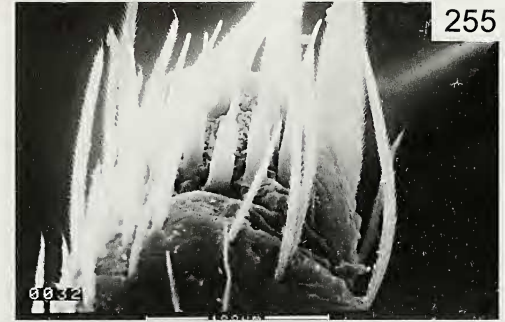
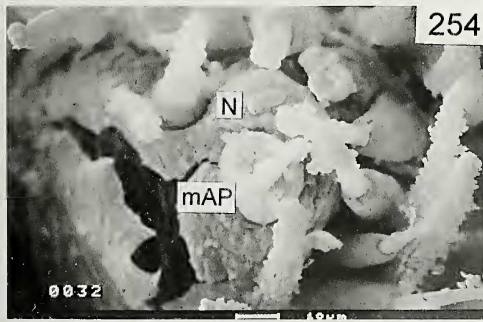
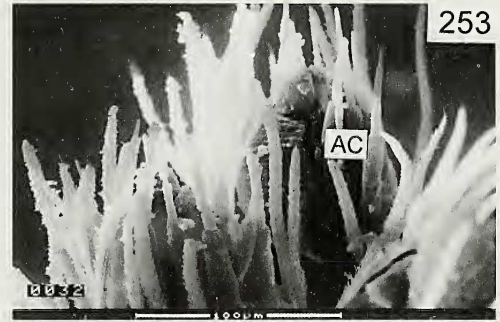
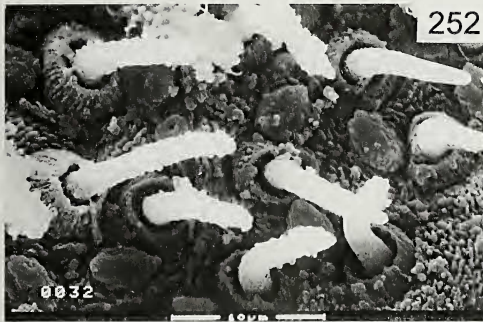
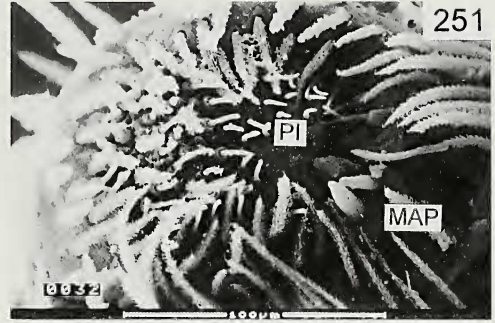
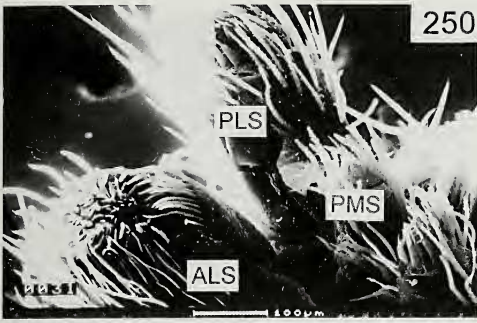
Figures 244–249.—Spinnerets of female *Pisaura sublama*. 244. Left spinneret group, $\times 200$; 245. ALS, $\times 500$; 246. PI in ALS, $\times 1300$; 247. Right PMS, $\times 1000$; 248. Left PMS, $\times 750$; 249. PLS, $\times 400$.

Yingluo ($21^{\circ}30'N$, $109^{\circ}42'E$), 26 August 1995 (GU).

Diagnosis.—The new species is closely related to *T. albocinctus* (Sierwald 1987: 119, figs. 127, 132–140, 143–148), but it differs from the latter by the shorter stalk of spermatheca (Fig. 166); narrower cymbium of male palpal organ, and the embolus mostly hidden by the median apophysis (Fig. 167).

Female.—Total length 22.14–26.00. Holotype total length 22.14: cephalothorax 9.99

long, 8.82 wide; abdomen 12.60 long, 6.03 wide. Carapace red brown, with lateral yellow bands. Chelicerae dark red brown. Labium, endites and dorsal legs red brown. Sternum gray yellow. Dorsum of abdomen dark brown, with lateral yellowish bands. Chelicerae with three teeth on both margins. Both eye rows strongly recurved. AME–AME:AME–ALE (0.31:0.24), PME–PME:PME–PLE (0.34:0.58); AME:ALE:PME:PLE (0.41:0.26:0.37:0.43). MOA 1.04 long, front width 1.07, back



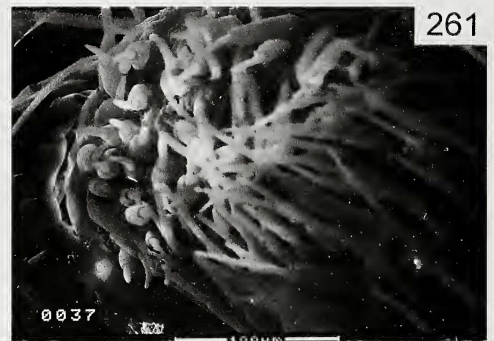
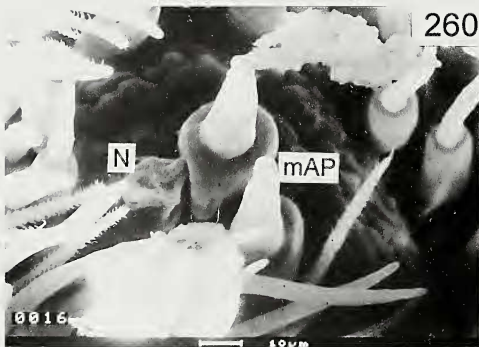
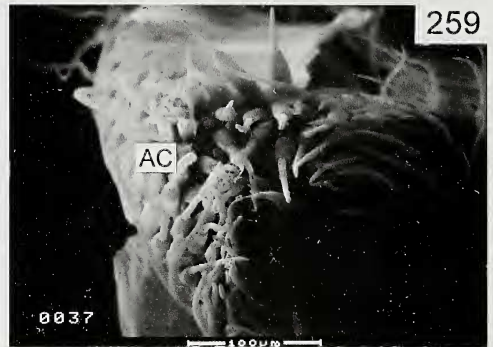
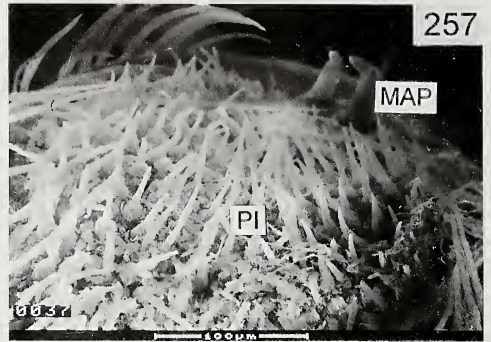
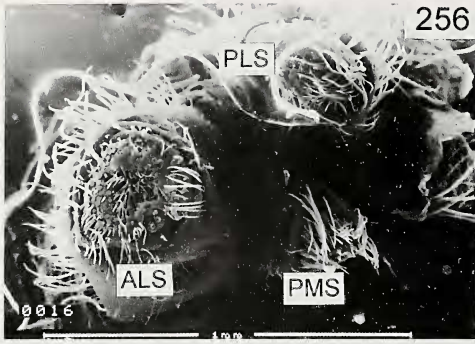
Figures 250–255.—Spinnerets of female *Polyboea zonaformis*. 250. Left spinneret group, $\times 170$; 251. ALS, $\times 600$; 252. PI in ALS, $\times 3500$; 253. PMS, $\times 470$; 254. mAP and N in PMS, $\times 1000$; 255. PLS, $\times 420$.

width 1.09. Measurements of legs: I 44.92 (12.42, 17.69, 10.49, 4.32), II 45.28 (12.96, 16.88, 10.80, 4.64), III 40.95 (11.97, 15.12, 10.08, 3.78), IV 48.24 (13.32, 17.55, 12.69, 4.68). Leg formula: 4, 2, 1, 3. Tibiae with four pairs of ventral spines. Median field of the epigynum wide and semi-circular; head of spermatheca round.

Male.—Total length 16.22–17.91. A male total length 16.22: cephalothorax 6.98 long, 6.12 wide; abdomen 9.91 long, 3.42 wide.

Characters as in holotype ♀. Measurements of palp and legs: palp 8.06 (3.15, 1.22, 1.62, 2.07); leg I 37.10 (10.58, 13.55, 8.87, 4.10), II 37.18 (10.26, 13.64, 9.18, 4.10), III 33.35 (9.27, 12.15, 8.46, 3.47), IV 39.47 (10.35, 14.13, 10.49, 4.50). Median apophysis of the male palpal organ wide and large, embolus coiled spirally.

Etymology.—The specific name refers to its close resemblance to *T. albocinctus* (Dolleschall 1859).



Figures 256–261.—Spinnerets of female *Qianlingula bilamellata*. 256. Left spinneret group, $\times 85$; 257. ALS, $\times 340$; 258. MAP in ALS, $\times 1000$; 259. PMS, $\times 300$; 260. mAP and N in PMS, $\times 1010$; 261. PLS, $\times 360$.

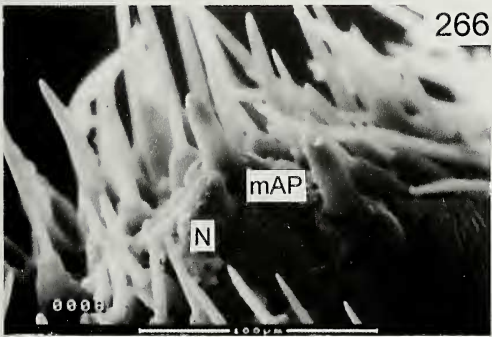
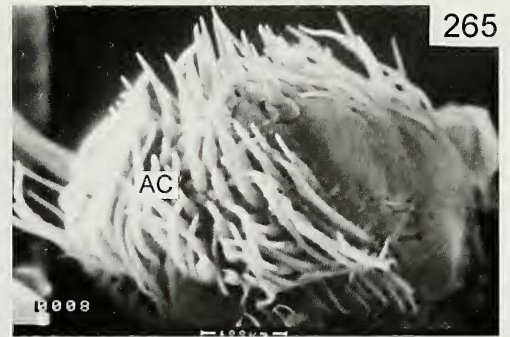
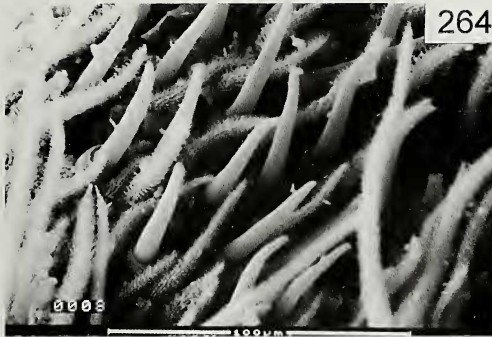
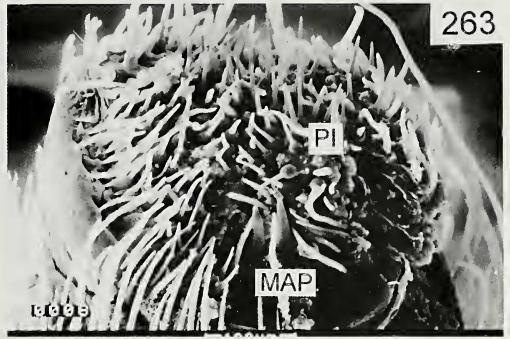
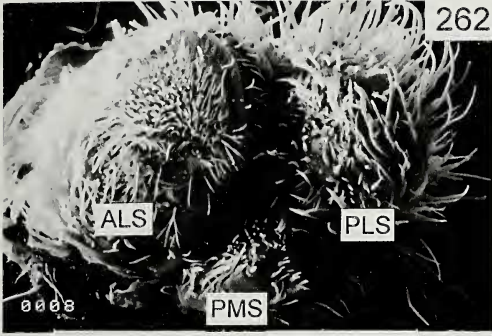
Distribution.—China (Yunnan, Guangxi).

Thalassius phipsoni F. O. P.-Cambridge 1898
Figs. 170–175, 262–267

Thalassius phipsoni F. O. P.-Cambridge 1898: 31 (holotype female from India, in the Natural History Museum, London, examined by Sierwald 1987); Lee 1966: 58, figs. 21a–b; Hu 1984: 265,

figs. 279.1–2; Sierwald 1987: 116, figs. 126, 128–131, 141–142; Chen & Zhang 1991: 225, figs. 234.1–4; Song et al. 1999: 353, figs. 204O–Q.

Thalassius affinis Song & Zheng 1982: 157, figs. 5–8 (holotype female, allotype male, 2 females, 1 male paratypes from Sanmen, Zhejiang, China, in IZB, examined); Hu 1984: 264, figs. 278.1–4;



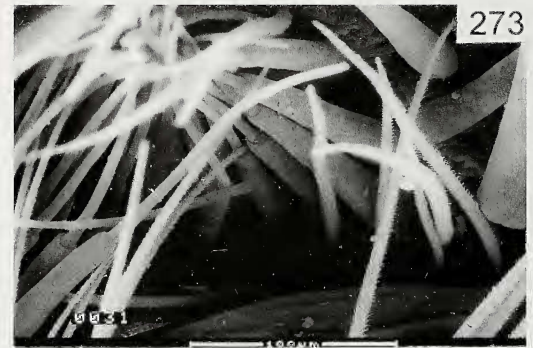
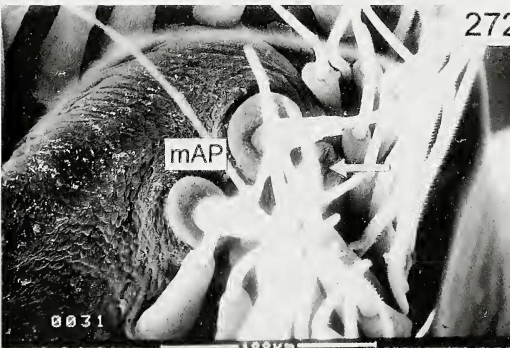
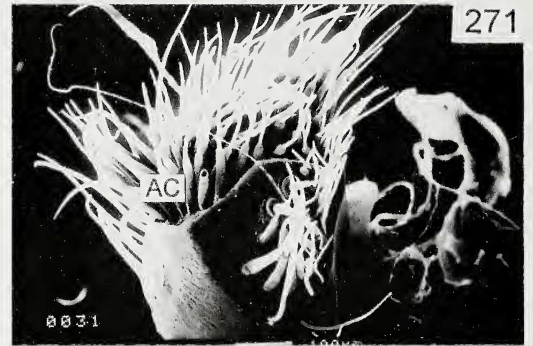
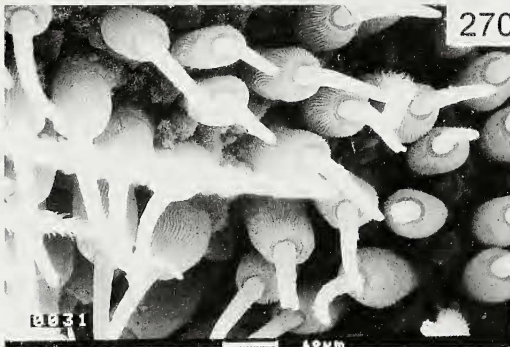
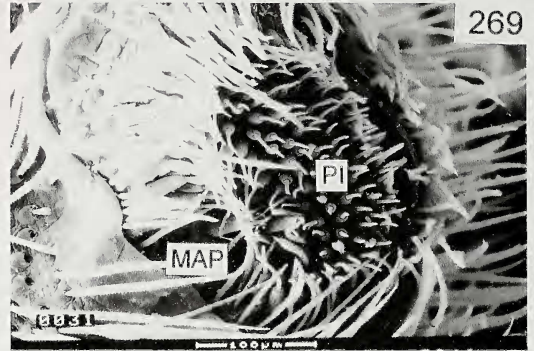
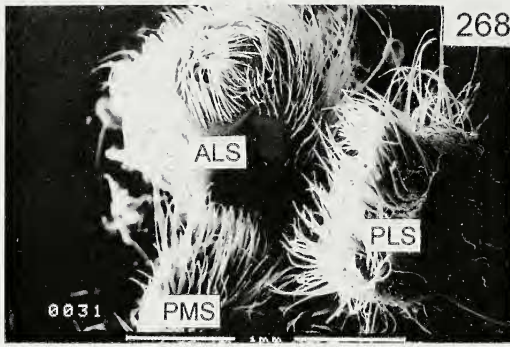
Figures 262–267.—Spinnerets of female *Thalassius phipsoni*. 262. Left spinneret group, $\times 80$; 263. ALS, $\times 200$; 264. PI in ALS, $\times 600$; 265. PMS, $\times 200$; 266. mAP and N in PMS, $\times 550$; 267. PLS, $\times 200$.

Song 1987: 212, fig. 172; Feng 1990: 161, figs. 136.1–6; Chen & Gao 1990: 138, figs. 173a–b. First synonymized by Sierwald (1987).

Material examined.—Holotype female, allotype male, 2 female, 1 male paratypes of *T. affinis*: Sanmen, Zhejiang, China, 19 June 1976 (IZB). CHINA: *Guizhou*: 1 ♀, Meitan, 10 September 1979, L.F. Jiang (MHU); 1 ♀, Maolan National Natural Reserve, Libo, 13 August 2000, G.M. Tang (MHU); *Fujian*: 1

♀, Longqi Mt., Jiangle, 14 August 1991, S.Q. Li (IZB); *Sichuan*: 2 ♀, Panzhihua, 11 August 1999, S.H. Dong & Z. Li (MHU).

Diagnosis.—The species differs from *T. paralbocinctus* in lateral margins of lateral lobes of the epigynum parallel; median field almost quadrate (Fig. 171); head of spermatheca boot-shaped (Fig. 172); median apophysis small and hook-shaped; embolus sickle-shaped (Figs. 173–175).



Figures 268–273.—Spinnerets of female *Hippasa lycosina*. 268. Left spinneret group, $\times 60$; 269. ALS, $\times 260$; 270. PI in ALS, $\times 1200$; 271. PMS, $\times 125$; 272. mAP and N in PMS, $\times 470$; 273. PLS, $\times 450$ (white arrow refers to nubbin).

Female.—Descriptions of *T. affinis* see Song & Zheng (1982). Lateral lobe of the epigynum kidney-shaped; median field almost quadrate; head of spermatheca boot-shaped.

Male.—Descriptions of *T. affinis* see Song & Zheng (1982). Palpal tibia curved; tibial apophysis reduced; median apophysis small and hooked; conductor foliar in lateral view.

Distribution.—China (Zhejiang, Fujian,

Sichuan, Guizhou, Taiwan, Hong Kong); India.

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